LITERATURE ON MIGRAINE
A BIBLIOMETRIC ANALYSIS

(1992-2002)

DISSERTATION

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Dedicated
to
Satguru

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Certificate

This is to certify that **Miss. Vaishally Arora** has completed her dissertation entitled ***"Literature on Migraine : A Bibliometric Analysis (1992-2002)",*** in partial fulfilment of the requirements for the award of degree of ***Master of Library and Information Science (2003-2004)***. She has conducted the work under my supervision and guidance. I deem it fit for submission.

Mr. S. Mustafa K. Q. Zaidi
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BIBLIOMETRICS

INTRODUCTION

The discipline that investigates the properties and behaviour of information, the forces governing the flow of information and the means for processing information for optical accessibility and usability is termed as "Information Sciences" where as the information is the message conveyed by a systamatized body of ideas or its accepted or acceptable substitutes.

After II World war, information explosion has been taking place. In the present age, librarians have been observing the ever-growing number of bibliographic units like books, periodicals articles in periodicals, corresponding increase in the size of library collection, number of catalogue cards, change in search strategy and so on. This becomes all the more problematic because of the inelastic budgetary provisions, Realizing these factors, no single library can afford to acquire every document. Hence limited and related procurement of journals seems to be one of the practical remedies. Biblimetrics is relatively of recent origin. Bibliometric studies are conducted to identify the pattern of publications, authorship, and citations used for a subject etc. Over a period of time and there by offering insight into the dynamics of the area under a particular study.

1. BIBLIOMETRICS

Bibliometrics has been derived from the two words **'Biblion'** and **'Metric'**. The word **'Biblion'** means **'books'** and **'Metric'** means **'measurement'**, So, Bibliometrics generally means **'measurement pertaining to book'**.

Bibliometrics is of recent origin and is relatively new branch of information science. It lies between the border area of the social sciences and the physical

science. It has emerged as a research front in its own right in information science. It is now emerged as a research front in its own right in information science. It is now being vigorously pursued and with the result it has found that one-fourth of all the articles published in Library and Information science periodicals are on Biblimetrics and its related topics.

The basic units of Bibliometrics are all facets of written communication such as primary and secondary periodicals, articles and abstracts published in them, bibliographies of articles, books, monographes and other media of communication.

1.1 ORIGIN AND HISTORY

First study regarding Bibliometrics was conducted in 1917 by **Cole** and **Eales** on "The History of comparative Anatomy, Part-I:A statistical analysis". The first term used for this was **"Statistical Analysis".**

The second study done by **'Hulme'** in 1923 under the term **'Statistical Bibliography'** and later it was used by **Henkle** (1938), in his article "The periodical literature of Biochemistry' **Gosnell** (1993), **Barker** (1966) also used the same term i.e. **'Statistical Bibliography'.**

Gross and **Gross** study is considered to be the third in the field based on citations. In 1968 **'Alan Pritechard'** initially used the term **'Statistical Bibliography'** in his work but he analysed the term and found it could be confused with **"Statistics"** itself or **'Bibliographics on statistics'** Therefore he coined another term i.e. **"Bibliometrics"** in 1969.

1.2 RELATED TERMS

The term Bibliometrics is of recent origin. In 1948, the great Indian library scientist, **Dr. S.R. Ranganathan,** coined the term. **LIBRAMETRY** which historically

appeared first, perhaps seemed proper to streamline the service of librarianship. The term 'Bibliomertrics' is just analogous to Ranganathan's **LIBRAMETRICS** the Russian concept of **'SCIENTOMETRICS'** FID's **INFORMATRICS** and to source other well established sub discipline like **ECONOMETRICS, PSYCHOMETRICS, SOCIOMETRIC, TECHNOMETRICS, CHEMOMETRICS,** etc, where mathematically & statistical calculus have been systematically applied to study and solve problems in their respective filed. Now-a-days, the term **'SCIENTOMETRICS'** is used for the *application of quantitative methods to the history of science and obviously overlaps* with bibliometrics to a considerable extent.

1.3 LIBRAMETRICS

The term **"Librametry"** historically appeared first in 1948. It was suggested by Indian library scientist S.R. Ranganathan under this term he suggested using of mathematical and statistical method for analysing library activities and library resources. But this term did not take its place in library science and was forgotten for many year. Later it was called 'Librametrics'.

1.4 SCIENTOMETRICS

In 1969, the term '**Scientometrics**' was suggested by two Russian named **Nailmov** and **Z. Mul chinko** in their book "**Scientometrics**". The investigation of science as development of information process" According to them scientometrics is a complex of quantitative methods, which are used to investigate the process of science.

1.5 INFORMETRICS

The FID's term '**Informetrics**' was suggested by German scientist.A **Blackert** and **S.Z. Zygel** in **1982** as a newly formed branch of science, using mathematical level and practical information activities.

1.6 WEBOMETRICS

Recently a new growth area in Bibliometrics has been in the emerging field of webometrics or cybermetrics as it is often called. Webometrics can be defined as using of bibliometrics techniques in order to study the relationship of different site of world wide web such techniques may also be used to map out (called "Scientific mapping" in the traditional bibliometrics research area of the web) some other well established sub discipline like Econometrics, Psychometrics. Sociometric and Biometrics.

1.7 DEFINITIONS

Many attempts have been made to define the term 'Bibliometrics' as given below –

Hulme (1923): The purpose of statistical Bibliography is to "shed light on the process of written communication and of the nature and course of development of a discipline by means of counting and analysis of various facets of written communication".

Raising (1962): "The assembling and interpretation of statistical data relating to books and periodicals to demonstrate historical movements, to determine national and universal research, use of books and journals".

Pritchard (1969): "The application of mathematical methods of books and other media of communication".

Howkins (1977): "Bibliometrics is the quantitative analysis of the bibliographic feature of a body of literature".

Fairthorne (1969): "Bibliometrics is the quantitative treatment of properties of record discussed and behaviour appertaining to it".

Potter (1981): "Bibliometrics is the study and measurement of the publication patterns of all forms of written communication and their authorship".

Schrader (1981): "Bibliometrics is the scientific study of recorded discourse".

Broadus : "Bibliometrics is the quantitative study of physical published units or of bibliographic units of surrogates of either".

Sengupta: "Organisation, Classification and quantitative evaluation of publication patterns of all macro and micro communication along with their authorship by mathematical and statistical calculus".

British Standards Glossary of Documentation of Terms:

The use of documents and patterns of publication in which mathematical and statistical methods have been applied".

2. BIBLIOMETRICS : SCOPE

Nicholas and Richie in 1978 very "Lucidly elaborated the scope of bibliometrics. They opined that bibliometrics provide information about the structure of knowledge, how it is communicated", They further added that 'Bibliometrics' studies fall mainly into two broad groups:-

A) **Descriptive Studies** i.e. those describing the characteristic or feature of a literature.

B) **Behavrioural Studies** i.e. those examining the relationship formed between component of literature.

While defining the scope of 'Bibliometrics, **Donicl Connor and Henry Voos** add that the "Scope of Bibliometrics includes studying the relation with in the literature typically these descriptions focus on consistent patterns, involving authors,

monographs, journals or subject language". **Rolland and Stevens** consider Bibliometrics as quantitative science and divides it into two basic categories viz.

Descriptive Bibliometrics and Evaluation Bibliometrics, he has further divided these two areas into different sub areas as given below:-

A) Descriptive Bibliometrics

- Geographic
- Time period
- Discipline

B) Evaluative Biblometrics

- Citations Count
- Reference Count

Stevens further adds that descriptive bibliometrics include the "Study of the number of publications in a given field or productivity of literature in the field for the purpose of comparing the amount of research in different countries, the amount produced in different subdivisions of the field. The kind of study is made by count of those writings, which have been abstracted, in a specialized abstracting journals. The other i.e. evaluative bibliometrics includes the study of the literature used by the research workers in a given field. Such a study is often made by counting the references cited by a large number of research workers in their papers".

2.1 PURPOSE

Pritchard in 1969 assigned its purpose as to shed light on the process of written communication and of the nature and course of development of a descriptive means of counting and analyzing the various facts of written communication.

According to **Dr. S.N. Singh** "The purpose of bibliometrics is to provide quantitative analysis of the phenomenon going with documents, their organization, use and services in Library and information center and systems. It offer to the information workers a type of statistical technique for the study of characteristic and attributes of literature and that of communication media." The main purpose of Bibliometrics study is :-

- To find out major forms of literature.
- To prepare a ranked list of journals.
- To make a comparison between ranked journals.
- To identify the Country with greatest literary output.
- To find out the chronological scattering of cited literature.
- To ascertain the amount of utilization of language.

Some other purpose are:

- To develop norms and standardization.
- To regulate inflow of information and communication.
- To identify authorship and its trends in documents of different subjects.
- To measure useful news of adhoc and retrospective SDI service and so on.

2.2 APPLICATION OF BIBLIOMETRICS

Bibliometrics techniques are now being consistently used to get factual and accurate data for information handling and transfer. Enumerated below are some of the areas where Bibliometrics techniques may be used:

- To identify quantitative growth of discipline and its literature quantitatively.

- To Evaluate the growth of research of an individual, of an institution or of a country.
- To assess the research output i.e. productivity study of an individual scientists, an entire organizations of a country.
- To undertake Sociological studies of science and scientists.
- To study post, present and predict future of scientific classics.
- To estimate comprehensiveness of secondary periodicals.
- To regulate inflow of information and communication.
- To develop norms of standardization etc.
- To find out core journals by applying Bradford's Law.
- To find out the productivity of scientist by applying Lotka's Law.
- To study the rate of collaborative research.
- To find out the trends in research activities.

2.2.1 APPLICATION IN INDEXING

Bibliometrics studies have been made in the areas of Library & Information work also. Studies have been made to find out the pattern of frequency distribution of descriptors of the thesaurus and the distribution of indexing terms. **Eugenics Toma** analysed the rank-frequency distribution of the EURATOM Thesaurus. Zipf's Law essentially a hyperbolic function, was not found suitable for such distribution. On the other hand a exponential function was found in good agreement with the actual entropy of the thesaurus. This exponential function. May provide a criterion to revise some zones of

thesaurus.

2.2.2 APPLICATION IN LIBRARY MANAGEMENT

It has been said that bibliometrics studies should ultimately help in library management. It is true that knowledge of scattering and obsolescence can be utilized in the acquisition and management of stops. But there is much more scope for investigation. Such investigations have been shown by **A.D. Boothe** while considering the optimum physical layout of a library when it is desired to minimize the distance to be traveled by the reader while picking up the books from the shelves. This means books are to be arranged according to their frequency of use. Several interesting geometrical models of stocks have been suggested by **Boothe**. It is claimed that frequency ordered arrangement can load to increased efficiency by as much aftertimes.

2.2.3 UTILITY OF BIBLIOMETRICS IN RESEARCH

At present, bibliometrics work often provides the background for a more practical task. It is an established technique covering wide area of knowledge. It has therefore been able to involve scholars from many of these disciplines. Consequently it has attracted scholars from different disciplines or their respective fields . Day by day, it is attaining sophistication and complexity having national, international and interdisciplinary character. It has established itself as a variable and distinctive research technique for studying science of science based on bibliographic data. As a matter of fact, its backbone lies in its sound theoretical foundation most efficiently and effectively laid by some pioneers like **Gross, Lotka, Bradford, Zipf, Derek J. De Solla Price, Bookstein, Massaverik, Col Brother, Pritchard, Garfield Hulme, Fairthorne** and Many others who are all not basically librarian, but belong to different branches of knowledge.

The techniques evolved by these pioneers are capable of throwing light on various complicated problems faced by many while handling information to quantify the process of written communication. It has established itself as a viable and distinctive measurement of human knowledge. Data analysis both of citations and of volume of publications year by year can be useful in planning retrospective bibliographies.

Bibliometrics also provides information about the structure of knowledge. Its classification studies give information about the subject language and country relationship, which is based on literary warrant. Bibliometrics is very useful in any field of research as in any discipline or it can be used in small and manageable ways by individuals, to improve some port of library and information services.

3. BIBLIOMETRICS LAWS

There are three fundamental laws which laid the solid foundation of bibliometrics:

1. Lotka's Inverse Square Law of Scientific Productivity (1926);
2. Bradford's Law of Scattering of Scientific Papers (1934); and
3. Zipf's Law of Word occurrence (1949)

3.1 LOTKA'S INVERSE SQUARE LAW

This law was put forth by **'Alfred J Lotka'** in **1926**. It relates to the productivity of scientists in terms of number of papers published by them. He was interested in determining, "if possible the port which men of different caliber contribute to the progress of Science".

Lotka studied the productivity of authors by publication frequency as indicated in **chemical abstracts** from 1907 to 1916. Similarily, he studied the name index of **'Auerbach's Geschietftafeln der physik'**. It revealed that the productivity of the

scientists confirmed to inverse square law, such that for every 100 authors contributing one article, 25 will contributed 2 article, 11 will contribute 3 articles and 6 will contributed 4 articles and so on. The observed figure for single articles authors were 57.9% for. Chemical abstract data (6,891 Contributors) and 59.2% for Physics data (1,325 contributors).

The frequency distribution of productivity of authors of scientific papers was first studied by Lotka, who proposed that number of authors making 'n' contributions is about $1/n^2$ of these making one contribution, and the proportion of all contributors who make a single contribution is about 60%, or $n(n) = K/n^2$ where 'a' is the number of authors producing n papers and 'K' is a constant.

The original paper of Lotka gave no suggestion to show that this was a universal law with applicability to all branches of knowledge, or even for that matter to all the branches of science, Subsequent studies have shown that this law is applicable to the subjects of History, Technology, Science, Literature etc.

3.2 BRADFORD'S LAW OF SCATTERING

Of all the Bibliometric laws, Bradford's Law has received greatest attention in the literature of Library and Information Science. Bradford's Law of scattering was promulgated by the British bibliographer '**Samuel Clement Bradford**'. Bradford's concern was with the problem of seepage and scattering of articles in primary journals and their coverage in indexing and abstracting sources.

Much earlier he described the pattern of scattering of literature in a subject in various periodicals, in a paper on Applied Geo-Physics and Lubrication. In this study he found out that 9 journals covered 429 articles and the next 59 journals accounted 499 articles, in other words first nine journals contributed for one third of the articles found on the subject, the next 5x9 journals accounted for another one-third and the

next 5x9x9 journals for the remaining one-third. In other words periodicals can be categorized in three separate groups as under :

1. Those periodicals which carry four reference in a year, in a given subject.
2. Those which carry between two and four in time.
3. Those which carry one or fewer reference in a year.

The first group thus becomes the nucleus of periodicals in a subject and necessarily contains more articles on that subject rather than periodicals that cover articles on related subject.

On the basis of above study Bradford enunciated "If scientific periodicals are arranged in order of decreasing productivity of articles on a subject, that may be divided into a nucleus of periodicals more particularly devoted to the subject and several groups or zones containing the same number of articles as the nucleus when the number of periodicals in the nucleus and succeeding zones will be $1 : n : n^2$.

where '1' is the number of journals in the nucleus and 'n' is a multiplier.

The refinement of law has been made by **B.C.Vickery**. He found discrepancy between the verbal and graphical representation of Bradford's law.He pointed out that application of the Bradford's Law should not only be limited to three zones, but with suitable modification of the value of ratio 'n' to any number of zones.

3.3 ZIPF'S LAW OF WORD OCCURRENCE

This law was given by **George K Zipf** in **1949**. Zipf's law state that "in a long textual matter if words are ranked on the basis of their frequency, then rank of any given word of the text will be inversely proportional to the frequency of occurrence of the word".

i.e. $f \propto 1/r$

or $f \times r = c$

where 'c' is constant.

He found that by multiply the a numerical value of each rank (r) by its corresponding frequency (f) he obtained product (c) which is constant throughout its text.

Example

Word	Rank (r)	Frequency (f)	F x r
The	1	245	245
An	2	136	272
A	3	100	300
To	4	81	324
Are	5	66	330

Thus, these three laws are respectively based on

i) Number of authors contributing in a discipline or other fields.

ii) Distribution of articles in a set of journals.

iii) Ranking of word frequency in a particular set of documents.

3.4 SOME OTHER EMPIRICAL LAWS

3.4.1 PRICE'S SQUARE ROOT LAW OF SCIENTIFIC PRODUCTIVITY

This law was given by **Derek J. de Solla Price** in **1971**. This law states that "half of scientific papers are contributed by the square root of the total number of scientific authors".

3.4.2 GARFIELD'S LAW OF CONCENTRATION

This law was enunciated by **Eugene Garfield** in **1971**. This law states that "a basic concentration of journals is the common core of nucleus of all fields".

3.4.3 SENGUPTA'S LAW OF BIBLIOMETRICS

This law has been put forward by **I.N. Sengupta** in **1973** which is also known as off setting weightage age formula for re-ranking periodicals to avoid discrimination against new journals which necessarily have citation credits. This is basically an extension of the Bradford's Law. It states that during phase of rapid growth of knowledge in a scientific discipline, articles of interest to that discipline appears in increasing number of periodicals distant from that field".

Mathematically this law stands in the following form:

$F (X+Y) = a + b \log (X+Y)$

When f (x-y) is the cumulative number of references as contained in the first (x+y) most productive journals, X indicates number of journals of unrelated (Y>X) and 'a' and 'b' are two constant.

4. SUBDIVISION OF BIBLIOMETRICS

4.1 Operation Research (Linear Programming, Transport problems)

4.2 Statistics (Multivariable Techniques, Trends, Correlation)

4.3 Bibliometric laws (Laws of Zipf, Lotka and Bradford)

4.4 Citation analysis (Networks, Science Policy)

4.5 Circulation Theory (Models)

4.6 Information Theory

4.7 Theoretical aspects of Information & Retrieval.

5. CITATION ANALYSIS

Citation analysis is the area of biblimetrics but studies the citation and from documents. It is a research method that can focus on the document themselves, on

the author or the journals and other publication in which they appear simply put, citation analysis can provide a picture of "where the action" is in a disciplines. By gathering and analyzing subjects citation statics, who's writing what, subjects are popular, which journals and authors are cited most and by extension, considered the most influential.

The Primary function of citation is to provide, "a connection between documents, one which cites and others which is cited". There are umpteen no. of reasons for giving citations. **Weinstack, Lipetz, Moravcsik** and **Murugesan, Hadges, Oppenheim** and **Renn, Finney, Frost** and **Thorne** have all attempted to explore the possible reasons for inclusion. However, it has to be conceded that if the reason is positive there is bound to have some connection between the citing and cited papers. The first recorded citation analysis was a study by P.L.K. Gross and E.M. Grass published in 1927 in order to determine the journals to be subscribed to and the back volumes to be acquired for the 'Library of the Pomono College'. They studied the citation frequency in the references given in the journals of the American chemical society. Citation analysis is very often fruitfully applied to derive the following benefits:

(a) TO LEAD THE READER TO FURTHER STUDIES IN THE FIELD

This is perhaps, the primary purpose of citation. Readers can verify the correctness of the information and thereby convince themselves.

(b) FOR THE PREPARATION OF BIBLIOGRAPHIES

This use of citation indexing was made in shepherd's citations published in 1873, this technique of citation indexing has been prepared by E. Garfield and others since early 1960s. It is fact that compilation of bibliographies in new field is really difficult. In such is circumstances, analysis of citations of articles may be the only way to gather information. The very fact that the citations have been verified, evaluated and recommended by authors who are experts in their own fields make them all the more acceptable for inclusion in a bibliography.

(c) TO STUDY THE USE PATTERN OF DIFFERENT TYPES OF DOCUMENT

Citation given may be of books, journals, articles, reports standard, thesis/dissertation etc. The relative use each of these types can be ascertained based on the frequency of citation. For example, various citation studies have shown that the journals articles are the most preferred source consulted by scientist since they continue about 70-80% of the total citations. Similarly citation practice among social scientists indicates that they give equal importance to books and journals.

(d) TO FIND OUT THE RELATIVE USE OF DIFFERENT LANGUAGES

Since English has emerged as a world Language, especially in Science & Technology, there is a predominance of English language publications in all branches. This can easily be understood from citation analysis. In the mid-sixties, for instance the share of English language papers in Mathematics and Chemistry was more than 50%. Russian occupied the second second position with about 20% followed by German and French citation practices have also shown that the relative amount of literature different in different subject produced by different countries changes with time. It has been observed that German has declined very much in the 20th Century, especially in the field of chemistry where publications in this language reigned supreme.

(e) TO STUDY THE USE OF LITERATURE FROM DIFFERENT COUNTRIES

From the citations, the country of their origin can be identified in all types of Materials like journal articles, books, reports etc. In many subject areas, US publications are found to be used more heavily. Journals of UK occupied the second position, but they come nowhere near their American counterparts in the frequency of use.

(f) TO STUDY THE SCATTERING OF SUBJECTS

Studies about the dispersion or scattering of subjects in different sources as evidenced by citation analysis have brought out interesting results for eg.

1. Social science and arts subjects show a wide scatter of publications than the sciences.
2. Research publications in technology show a greater dispersion than those in science.
3. A new branch of science, especially an inter-disciplinary one, shows greater dispersion than an older branch of Science.
4. There can be differences in scatter between sub-field within a subject as also among major subjects.
5. The rate of scatter within the same subjects alters with time.

(g) TO DECIDE THE OBSOLESCENCE RATE OF DOCUMENTS IN DIFFERENT SUBJECTS

Citation in subsequent literature and usage pattern in libraries are considered as two indication of the obsolescence rate of literature. Analysis of citation by age of the cited document can show the useful life of documents. In order to measure the decay or obsolescence of documents.

(h) TO DETERMINE THE INTERDEPENDENCE AND LINEAGE OF SUBJECTS

The interdependence of basic and applied field can be understood by citation studies. Establishment of this interdependence can be used in the acquisition policy of special libraries or information centers. The analysis of citations of the Annual Review of Medicine for the year 1965-69 by I.N. Sengupta, has established the contribution made by journals in the fields of Biochemistry and Physiology to medical research. Further studies by him have brought to light the mutual contribution of Biochemistry, Physiology and Microbiology.

As far as linkage of subjects are concerned, Garfield's experiments in citation indexes have very much contributed in mapping the history of many of them.

1. To prepare ranked list of periodicals
2. To study the rate of collaborative research.
3. For the analysis of scientific journals.
4. Citation rate of journals.
5. Impact factor.
6. Self-citing rate
7. Self-cited rate
8. Immediacy index

6. LIMITATION IN APPLICATION

Though most of the studies tend to support the Bradford distribution some other researches could not get the satisfactory results. Gross found that the scatter of research papers among physics deviated from that predicted by Bradford's law. Out of 50 bibliographies studied by Chonez, only six followed the law, he call it as the "**Pseudo Scientific Law**".

6.1 LOTKA'S LAW

In the case of Lotka's law it was found to fit in the most cases. However, the value of indexing was found to vary for different groups of scientists.

Another problem with Lotka's law is that it totally ignores the potential authors who have not produced any publication so far.

6.2 CITATION ANALYSIS

In case of citation analysis, the common arguments against it are as follows :

- Too much of self-citation and in-house citation.
- Practice or citing only to get the favours of the powerful or to appease others.
- Citation given just to dress up the paper.
- Variation of citation rate during life time of paper.
- Variation of citation rate with type of paper and speciality.
- Negative citation.

Because of all these limitations the empirical nature of these laws are generally questioned.

CONCLUSION

Bibliometrics studies have enabled scholars to develop a body of theoretical knowledge and group of techniques and have facilitated its application for the further growth of knowledge based on bibliographical data. Bibliometrics have contributed greatly to the development of library and information science. The subject is still at a

developmental stage and there is a great possibility of bibliometrics studies in various aspects of library and information work. Bibliometrics has emerged as the most active field of Library and information science during the past few decades. It is estimated that literature on this topic occupies more than 25% of the total contribution in Library and information science, citation analysis studies form a major portion of it, pertains the application of bibliometric laws. However, there is a long way to go in achieving perfection in the studies. Even the spread of computers for retrieval counting and analysis are unlikely to achieve perfection in the studies. This study is merely a method not a theory. To make it a theory and more useful, researchers must concentrate on the causal factors underlying biblimetrics phenomena. The changes that are frequently occurring in the publication practices are likely to complicate the studies in future. In such circumstances, it is advisable to consider the results of such studies as merely guidelines rather than ends in themselves.


Chapter–2

MIGRAINE

INTRODUCTION

Migraine has been known to medical science for nearly 2000 years, in the first century of the Christian era, **Aretacus of Cappadocia** referred to it as heterocrania and the term hemicrania from which the word,'Migraine' was derived.It was introduced by **Galen** (AD 131 –201). The current term 'Migraine' which in Greek means '**Half of the skull**'.

A Key feature of migraine headache is that it is periodic, with attacks lasting usually between 4 and 72 hours. The International headache classification committee of, the International headache Society suggest a prevalence in the women of between 15%and 20% and in men between 5% and 10% Migraine is extremely common.

The exact incidence of migraine headache is difficult to assess in the general population, but most authorities would accept that between5% and 10% of the U.S. population is affected, women are generally considered to be affected slightly more than men. Migraine often begins in childhood but may not start until after puberty. Although migraine may begin in later life, such occurrences are unusal.

WHAT IS MIGRAINE?

Migraine is a form of headache which is severe and usually one sided, frequently associated with nausea and vomiting.This is sometimes freceded by warning symtoms which usually affect the eyesight and are known as an "aura"

Migraine can often be recognised by its actiuators redunic , menses, hunger lack of sleep, glare, estrogen, worry, perfumes, let down periods and its deactivators (sleep, pregnancy, exhilaration,sumatriptan).

CATEGORIES OF MIGRAINE

The general categary of migraine headache is usually broken down into the more specific syndromes of headache with aura (classic) migraine; headache without aura (common), migraine cluster headache, hemipegic and ophthalmoplegic migraine and lower half headache.

(a) MIGRAINE WITH AURA (CLASSIC MIGRAINE)

Classic migraine occurs in only approximately 12% of patients with migraine headache. The aura of the classic migraine usually laste up to 1 hour. Preceding the start of the head pain, nausea , vomiting, photophobia, and sonophobia are contigent features. The painful attacks are often associated with a homolateral red, tearing eye, nasal stuffiness and ptosis.

(b) MIGRAINE WITH OUT AURA (COMMON MIGRAINE)

Common migraine occurs in some 80% of patients. The prodromes are generally vague and precede the actual headache by widly varying amount of time. Photophobia and sonophia are again noted, along with anorexia, nausea, vomiting,

(c) CLUSTER HEADACHE

Cluster Headache, also called histamine headache or Migrainous neuralgia, may be defined as a facial pain that is unilateral and of excruciating intensity that rarely lasts longer than 2 hours. They may occur several times per day for weeks or months separated by long intervals of completed freedom from the pain cluster headache is thought to be between 2% and 9% of all migraine suffered.

Cluster headache suffered are notoriously susceptible to attacks after ingestions of alcohol and the use of nitroglycerin or listening- containing compounds

stress may also be factor, climate changes and attacks of allergic hay fever may also trigger the cluster mechanism.

(d) OPHTHALMOPLEGIC MIGRAINE

Ophthalmoplegic migraine is a rare syndrome usually seen in young in adults, the pain is generally less intense than in classic migraine and is located on the same side as Ophthalmologic. Attacks may last for days or weeks may involve visual function.

(e) HEMIPLEGIC MIGRAINE

Hemiplegic Migraine is characterized by neurologic deficits that range from mild hemiparesis to full hemiplegia. The deficits may persist for sometime after the headache

SIGN & SYMPTOMS

People sometimes feel not quite right prior to migraine eg. Depressed, unusually happy or Hungry and in addition may suffer from visual changes eg. Flashing, Zig Zag lines, or a blind spot. The headache is usually one sided although it is not invariable the same side. Quite quickly nausea and vomiting may follow. The bowels may also be affected and in children sometimes there is no headache but abdominal pain instead.

A typically migraine attack produces some or all of there sign and symptoms;

- Moderate to sever pain 60% of migraine sufferers feel pain on only one side of their head, while 40% experience. Pain or both sides.
- Head pain with a pulsating or throbbing quality.
- Pain that worsens with physical activity.

- Pain that hinders your regular daily activities.
- Nausea with or without vomiting.
- Sensitivity to light and sound.

When left untreated, migraine typically last from 4 to 72 hours, but the frequency with which they occur can vary from person to person. Migraine headaches may several times in a month or just once or twice a year.

80% of people suffer from migraines without aura. About 15% of adults have migraine headaches with auras. If you are in the second group, you'll likely have auras about, 15 to 30 minutes before yours headache begins, they may continue after headache starts or even occur after headache begins, there may include

- Sparking flashes of light.
- Dazzling zigzag lines in field of vision.
- Slowly spreading blind sports in vision.
- Tingling, pins and needles sensation in one arm or leg.
- Rarely, weakness or language and speech problems.

CAUSES

Each person is different but these are some "trigger" factor which are commonly involved:

- Tiredness exhaustion
- Physical exhaustion
- Stress
- Climate change

- Foods e.g. Caffeine, cheese, chocolate, red wine.

(a) HORMONAL CHANGES

Although the exact relationship between hormones and headache is not clear, fluctuations in estrogen and progesterone seem to trigger headache in many women with migraines.

(b) FOOD

Alcohol especially redwin and beer; aged cheese; chocolate; fermented, pickled or marinated foods; aspartame; caffeine; monosodium glutamate --- a key ingredient in some Asian food; certain seasonings; and many canned or processed foods, skipping migraines or fasting also can trigger migraines.

(c) STRESS

A period of hardwork followed by relaxation may lead to weekend migraine stress at work or home also can instigate migraine headaches.

(d) SENSORY STIMULUS

Bright light and Sun glare can produce head pain so can unusual smells including pleasant scents, such as perfumes or flowers, and unpleasant odors, such as paint thinner and secondhand smoke.

(e) PHYSICAL FACTOR

Intense physical exertion, including sexual activity may provoke migraines, changes in sleep patterns including too much or too little sleep also can be a problem.

(f) CHANGE IN THE ENVIRONMENT

A changes of weather, season, altitude level, borometric pressure or time zone can prompt a migraine.

TREATMENT AND PREVENTION

- Note down attacks in a diary and try to spot any common triggering factors, and avoid them if possible
- Try avoiding any food which seems implicated and at a later stage take a small trial dose of the food again to see whether it genuinely is involved
- At the first symptom of an attack take a painkiller e.g. Aspirin or paracetamol, even if this means walkling yourself up when notice symptoms which half asleep in the early hour of the morning.
- Most people find that it helps to lie down in a darkened room, in fact there may be little elseyou are able to do.
- Some times bathing head in a cold water or using a cold compress on the forehead is helpful.

There are. Some over the counter preparations, which contain a painkiller and a medication, which stops nausea vomiting

Doctor may prescribe something one of the more modern specific anti migraines, which work on one of the chemical pathways in the brain.

- If attacks are frequent and disruptive, then the doctor may press prescribe a drug to be taken daily as a preventative.
- Sometimes relaxation and meditation techniques may be helpful as many some of the complementary therapies

MEDICATIONS

Certain medications can aggravate migraine headaches:

At one time **aspirin** was almost the only available treatment for headaches. Now there are drugs specifically designed to treat migraines. Several drugs commonly used to treat other conditions also may help relieve migraines in some people.

All of these medications fall into two classes-those that reduce or prevent migraines (preventive medications) and those that stop pain once it has started (Pain-relieving medications).

Choosing a preventive strategy or a pain relieving strategy depends on the frequency and severity of headaches, the degree of disability headache cause and other medical condition may have. A candidate for preventive therapy if he have two or more debilitating attacks a month, if he use pain relieving medications more than twice a week, if pain reliving medications are not helping or if he have uncommon migraines.

PREVENTATIVE MEDICATIONS

Preventative Medications may reduce the frequency, severity and length of migraine and may increase the effect inches of pain-reliving migraines and may increase the effectiveness of pain relieving medicine used during migraine attacks. Preventive medications don't eliminate headache completely, and some can have serious side effect .take these medications everyday as doctor recommends :

- Nonsteriodal anti inflammatory drug (NSAIDs)

NSAIDs such as ibuprofen (Advil, Motrin, Others) and naproxen sodium (Aleve, Anaprox) may reduce the frequency of Migraine.

- Cardiovascular drugs
- **Beta- blockers** which are commonly used to treat high blood pressure and coronary artery disease can reduce the frequency and severity of migraines.

- The Antihypertensive medications **Lisinopril** (Prinivil, Zestril) and **Canderartan** (Atacand) are useful migraine prevention medications.
- **Antidepressants:** Certain Antidepressants are good at helping prevent all types of headaches, including migraines.
- **Antiseizure drugs** Some Antiexizure drugs such as divalproex sodium (Depakote) and valproic acid (Depakene),Topiramate (Topamax) and Gapapentin(Neurontin), which are used to treat epilepsy and bipolarles disease, seem to prevent nigrains. These antiseizure drugs can cause side effects such as nausea and vomiting, diarehea, cramps, hair loss and dizzlings.
- **Cyprohetadine (Periactian)** This antistamine specially affect seratonin activity. Doctors sometimes five it to children as a prevention measure.
- **Botulinum Toxin (BOTOX)** Some people receiving BOTOX injections for their facial wrinkles have noted improvement of their headaches.

PAIN- RELIEVING MEDICATIONS

For best result, take pain-relieving drug it may help if you rest or sleep in a dark room after taking them.

MILD PAIN-RELIEVERS

Over the Counter (OTC) medications such as **Ibuprofen** (Advil,

Motrin, others), **Aspirin** and **NSAIDs** may help relieve mild migraine. Drugs marketed specifically for migraine such as the combination of **Acetaminophen**, **Aspirin** and **Caffeine** (excedrin migraine), also may ease moderate migraines, but aren't effective alone for severe migraines. If OTC medications do not help, doctors may suggest a stronger, prescription only version of the same drug. If taken too after

or for long periods of time, **NSAIDs** can lead to ulcers, gastraintial bleeding and rebound headaches.

- **Triptans** Sumatriptan was the first drug specifically developed to treat migraine. Sumatriptan is available in oral, nasal and injection form. Injected Sumatriptan works faster than any other migraines specific medication in as little as 15 minutes and is effective in 70% to 80% of cases. But injections may be inconvenient and painful.

Since the introduction of Sumatriptan, a number of similar drugs have become available, including rizatriptan (Maxell) naratriptan (Average) Zalmiitriptan (Zoning), alenatriptan (Axert) Frovatriptan (Frova) and Electriptan (Relpox). These newer agent provide pain relief within two hours in 60% to 91% of patients, have fewer side effects and cause fewer recurring headaches. Side effects of triptan include nausea, dizziness,muscle weakness, hear attack.

- **Ergots** Drugs such as ergoatamine and dihydroergotamine and dihydroergotamine nasal spray help relive pain these drugs may have more side effects than triptan. Medication for nausea, Metoclpramide is useful for relieving the nausea and vomiting associated with migraine, not the migraine pain itself.

PREVENTION

- **Avoid triggers** If certain foods seem to have triggered headache in the past,eat something else. If certain sents are a problem, try to avoid them. Try to establish a daily routine with regular sleep patterns and regularly meals.
- **Exercise regularly** Aerobic exercise – about 30 minutes three times a week- reduces tension and can help prevent migraines. If doctor agrees, choose any

aerobic exercise, including walking, cycling and swimming. Warm up slowly, however, because sudden, intense exercise can cause headaches.

- **Quit Smoking :** If you smoke, talk to doctor about quitting smoking can trigger headaches or make headaches worse.

PREVALENCE AND CHARACTERISTICS OF MIGRAINE AMONG ADOLESCENTS: A Questionnaire Survey

By

D.Shivpuri, M.S. Rajesh and D.Jain

This study was conducted to find out the prevalence of recurrent headache and migraine in adolescent children at Jaipur and to describe the clinical characteristics of migraine headaches.

Headache is one of the most common neurological complaints in children.(1) Recurrent headache affect academic performance, memory, school attendance, personality and peer relations. The most common cause of recurrent headaches severe enough for a child to be brought to a pediatrician is migraine. Accounting for 50% of recurrent headaches. A large proportions of remaining headaches are caused by stress, anxiety or tension with resulting muscles contraction, (2) Almost 80% migraine attacks are without aura i.g. Common migraine.

SUBJECT AND METHOD

A Pilot Study was conduct at **'St. Anselm's Pink City School, Jaipur'**.

A large study was carried out in two Public School of Jaipur, namely **'St.Xavier's senior Secondary school'** and **'Maharani Gayatri Devi school'**. A Screening questionnaire **(A)** was distributed to **1000 boys** and questionnaire **1000 girls,** studying classes VI to X (11 to 15 years). Questionnaire **(A)** consisted of a single question to parents, "Does your child suffer from recurrent headaches?" To those who responded in the affarmative, a detailed questionnaire **(B)** was distributed. Questionnaire **(B)** consisted of twenty questions pertaining to characteristics and association of headeche.

RESULTS

Of the **1000 boys** and **1000 girls** distributed questionnaire **(A)**, **750 boys** and **555 girls responded** (**response rate** 65.2% overall, 75% among boys and 55% among girls). Recurrent headache was reported in 255 (19.5%) children 11-15 years of age (18% among boys and 21% among girls). Questionnaire **(B)** was distributed to these children. **125 boys** (91%) and **103 girls** (87%) returned their completed questionnaires (response rate 89%). Migraine was diagnosed in **145 children** (11%): 67 (9%) boys and 78 (14%) girls. The other causes of headache included tension type headache in 3.6%, eye problems in 0.38%, and sinusitis in 0.22% and cause undetermined in 2.14%.

Among the **145 children** with migraine the headache was found to be unilateral in 64 (44%), it had a pulsating quality in 77 (53%), interfered with play in 80 (55%), aggravated by routine physical activities in 84 (58%), associated with nausea and vomiting in 48 (33%), photophobia/ phonophobia in 77 (53%), and visual aura in 2 (1.37%).

Resolution of headache was spontaneous in 61 (42%), after medication in 25 (18%), and after sleep in 84 (58%). Eighty four (58%) parents of children with migraine had never consulted a doctor for headache. A positive family history of migraine was found in 51 (35%)children, 26% among mothers and 9% among fathers. Neuro-imaging studies had been done in 7 (4.8%): CT Scan in 5 (3.4%), MRI in 2 (1.37%) children.

DISCUSSION

Eighteen per-cent of boys and 21% of girls in the age group 11-15 years were found to suffer from recurrent headache. Of these 80% had headache severe enough to interfere with play or routine activity. 25% of children started having headache from 5-6 years of age. The prevalence of recurrent headache is reported to be 35.6% in

American Indian adolescents, 32.1% in white American adolescents (4), 37% in Polish children (5), 23% in 7-15 years old Swedish school children (6), 36.9% in primary school children in UAE (7) and 2.8% in primary school children in Hong Kong(8). Recurrent headache was found to be a significant cause of school absenteeism.

A diagnosis of migraine was made in 9% boys and 14% girls in our study population using IHS criteria. Of these less than 2% had migraine with aura. Migraine prevalence is reported to be 5.3% in 15 years old Swedish children (9), 6.2% in 4-15 year of Greek children (10), 8.42% in 6-19 year old Polish children (5), and 10.6% in 5-15 year old British children (11). A study from Chennai reported a migraine prevalence of 4% in 7-15 year old Indian children (12).

Kramer found that 54% of chronic headache lasting more than 3 months in children were migraine and that chronic and recurrent headache without accompanying neurological symptoms are usually benign and do not need neuroimaging studies (13).

Problems in methodology include reliability and validity of self-report data during cross-sectional questionnaire surveys. Data would have been more reliable had the questionnaire response been validated with direct child and parent interviews.

The prevalence of migraine is higher in our study population compared with that from other parts of the world. One possible explanation is that our study population consisted of 11-15 years old children, in whom the prevalence of migraine is high while other studies have considered a wider age group, thus diluting the prevalence.

Limitation of this study includes the possibility of bias in the diagnosis of migraine because the children and their parents were not directly interviewed at onset of study or on follow up. Further studies need to be undertaken to evaluate underlying factors responsible for the high prevalence of migraine in our population.


Chapter–3

OBJECTIVE, SCOPE AND METHODOLOGY

Though the term **'Bibliometrics'** was introduced only in 1969 to indicate a new discipline which employs quantitative methods for analysis of various aspects of written documents, its origin can be traced to be effort of early 20th century documentalists to apply mathematical and statistical analysis to bibliographical units. The most prominent effort were that of **Cole** and **Eales, Hulme, Lotka, Bradford, Ranganathan, Price, Kessler, Garfield,** by **Egghe**.

The discovery of the empirical laws of bibliometrics has led to a series of studies which can be broadly differentiated into quantitative and qualitative. In fact, the early statistical studies of Cole and Eale, Hulme, Lotka, Zipf and Bradford belong to quantitative category B.C. Brooks is of opinion that there are five such general objectives:

(1) Design of more economic information system and Networks.

(2) Improvement of efficiency rates of information handling process.

(3) Identification and measurement of deficiencies in bibliographical services.

(4) Prediction of publishing trends; and

(5) Discovery and elucidation of empirical laws that can provide a basis for developing a theory of information science.

SCOPE

The present study is according to the papers abstructed in 'Index Medicus' on the research output on **'Migraine'** over a period of 11 years as cited above. However, the findings are likely to have general implications for the scientific community working on **'Migraine'**. The period of study is 1992-2002.

OBJECTIVES

The major purpose of the present study is to examine the studies and research conducted during the last 11 years on the various aspects of the 'Migraine' and can be summarized as follows:

- To ascertain the strength and weakness of the research activities conducted during the last 11 years on 'Migraine'.
- To draw a detailed picture of the way in which literature has developed during the period of study and the relative distribution on the various facets of the subject field.
- To identify the gaps in the research output in respect of various forms of 'Migraine' and its allied areas.
- To identify in quantitative terms, the relation use of the different forms of the documents, authorship pattern, language etc. and their chronological scattering.
- To understand the core journals for the scientists working on 'Migraine' and to identify them.
- To investigate the degree of collaboration in authorship in the field of 'Migraine'.

METHODOLOGY

The following methods were adopted for the present study.

LITERATURE SURVEY

I have consulted various sources for the selection of topic such as chemical abstract, Index Medicus and Biological Abstracts.

Finally I selected **'Migraine'** in Index Medicus.

SOURCE CARD (Bibliometric Analysis: Level –1)

The entry had been prepared on a card of 3"x5" size. The following details had been noted down on the card.

First of the there is first name (surname) of the authors first letter in capital and rest of all in small letter, after this Forename in capital letter then comma. (,), then the first word of the Title up to 3 to 4 words and 3 dot (...), after that name of the journal which is underlined, then comma (,), after this there is year with month of the journals, its volume, issue number, page No. At the end, language and Form of the article has been given.

For example

Gillman MA, et al, Analegesic ..., AmJ Emerg Med, 2000 Jul: 18(4):501, Eng, Letter.

CITATION ANALYSIS

According to **Garfield** "true citation analysis is one which deals with works cited as having actually been used in the preparation of or having otherwise contributed to the source paper" In the present study, this method is used for measuring the relative use of Journal as sources of research information and also for identifying the core literature in specialized area of discipline. The journals present in Aligarh were studied and the references were taken out from the articles. Although this is not what is required normally this method was used because of the constraint of time and because it give a fairly accurate picture of the actual date.

ANALYSIS

The total data based on the entries has been collected and analysed under the following headings;

(1) Year wise analysis of the paper.

(2) Ranking of authors

(3) Authorship pattern

(4) Ranking of journals

(5) Geographical analysis (i.e. country wise)

(6) Language wise distribution of papers.

(1) Year wise analysis of the papers

The chronological study will till about the number of articles published in a year. The graph will show the upward or downward trend in the publication. The chronological study helps in the services of the library.

(2) Ranking of authors

This is done to know the eminent personalities in the subject. The data card of different contributors in the field were separated out. Authors are arranged in order of their decreasing productivity.

(3) Authorship Pattern

This shows that Authorship pattern whether the single authorship is more popular or the team research.

(4) Ranking of Journals

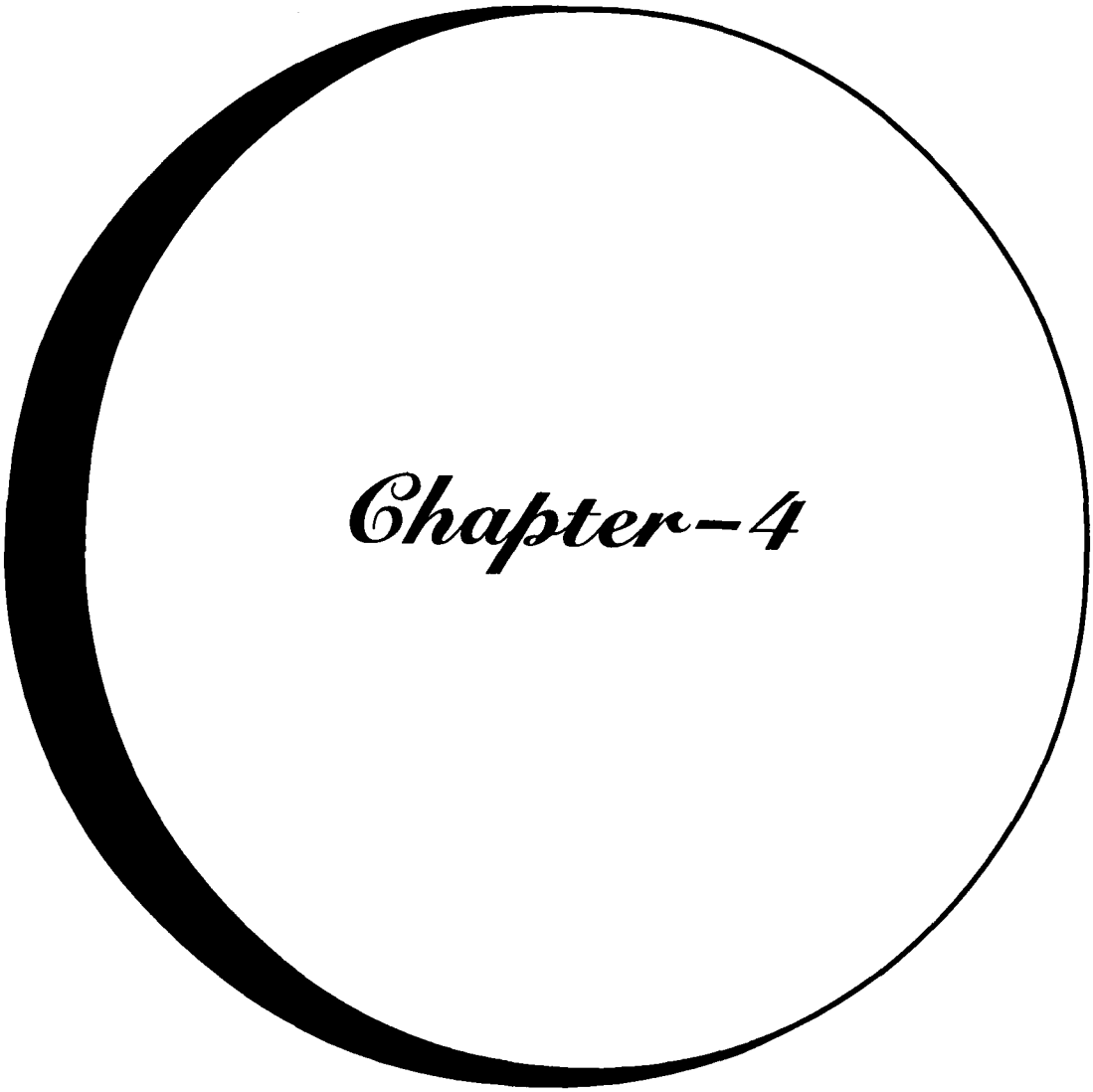
The main objective of this study is to identify the core journals containing the research literature on 'Migraine'. To conduct this, the items published in different periodical, are grouped together and counted. It is necessary to know the most productive periodicals in the subject. The information is useful for libraries as well as to research scholars.

(5) Geographical Analysis (i.e. Country wise)

This is done to find out the geographical scattering of items while studying the use pattern of research literature in the subject under study.

(6) Language wise Distribution of Papers

As the 'Index Medicus' is the most comprehensive source on its subject, its scope is international. In otherwords, Index Medicus reports items published from different countries in languages. It is therefore, important to know the most dominant language.


Chapter–4

DATA ANALYSIS, INTERPRETATION AND REPRESENTATION

Bibliometrics analysis is used to find out the nature and characteristics of **'Migraine'** research which is based on the papers published over a period of 11 years (1992-2002).

The analysis is done in two steps, firstly, the published papers were analysed. Secondly, the citations appended to the papers in the papers were analysed.

Analysis of the Papers

In the first level of analysis, the following was done

- Year wise analysis of papers
- Ranking of authors
- Authorship pattern
- Ranking of journals
- Geographical analysis
- Language wise distribution of papers.

LEVEL-1

BIBLIOMETRIC ANALYSIS

Year wise analysis of the papers

The table-1 shows that the maximum number of papers were published in the year 2001 i.e. 228 papers, and the minimum appeared in year 1992 i.e. 56 papers, during a period of 11 years (1992-2002).

Table-1

CHRONOLOGICAL DISTRIBUTION

Year	No. of Papers	% Age	Cumulative % Age
1992	56	3.19	3.19
1993	146	8.48	11.67
1994	165	9.59	21.26
1995	104	6.04	27.36
1996	122	7.09	34.39
1997	181	10.52	44.91
1998	147	8.54	53.45
1999	225	13.08	66.53
2000	185	10.75	77.28
2001	228	13.25	90.53
2002	158	9.18	99.11
Total	**1720**		

Year wise analysis of papers show that research work on 'Migraine' increased from 1993 and was its peak in 2001 and maintained its peak later also.

Ranking of Authors

The table-2 shows that ranking in 11 years study of 'Migraine' out of the 1472 authors, 1009 have written 1 articles, 106 have written 2 articles, 32 have written 3 articles and 13 have written 4 articles each and so on.

Among the authors **C. Dahlof** is the most productive authors with 24 articles whereas, **H. C. Diener** is on the second position with 23 whereas, **R. B. Lipton** is on the third position with 18 articles. Due to joint authorship the number of authors have increased.

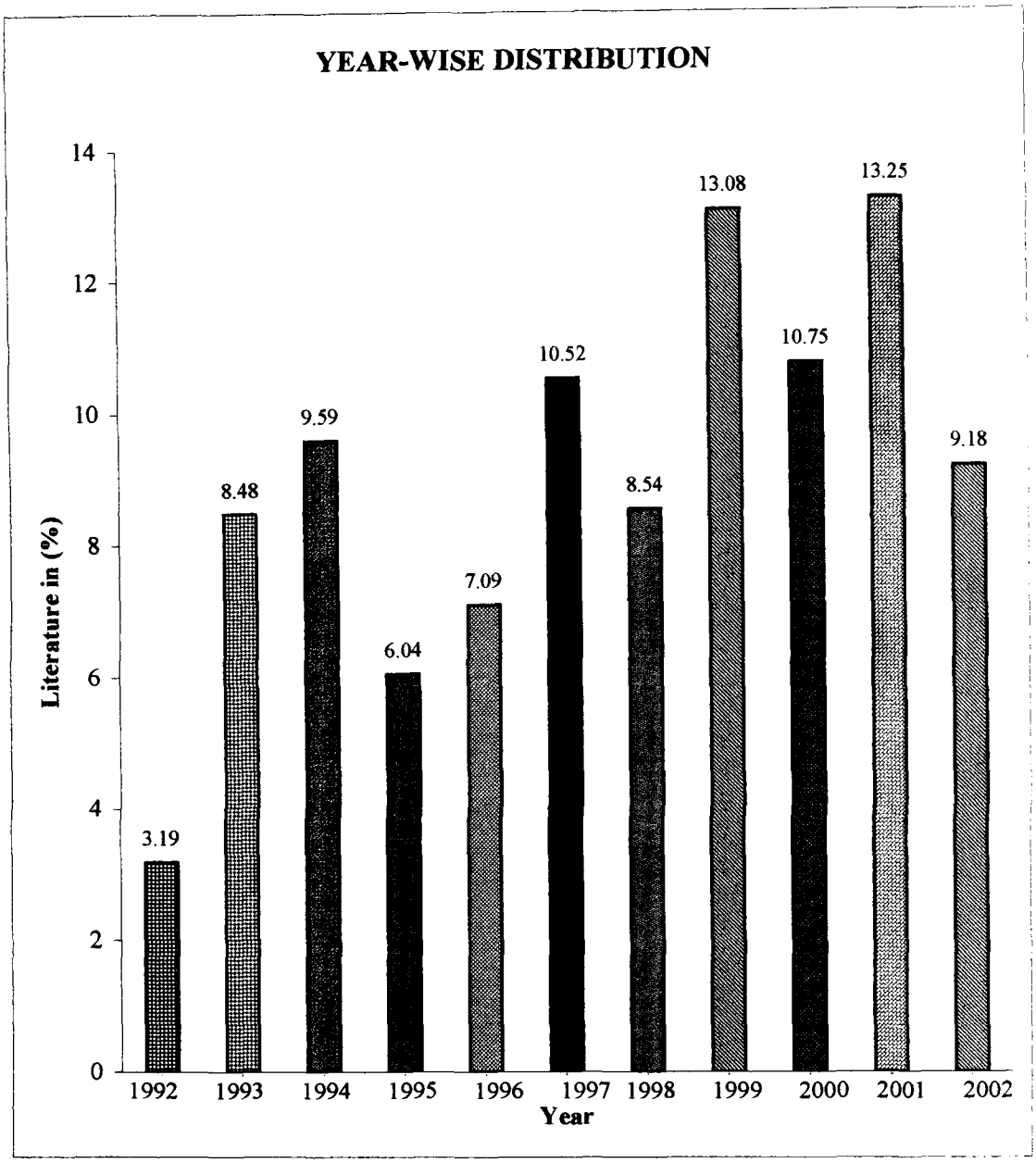

YEAR-WISE DISTRIBUTION
Literature in (%)
14
12
10
8
6
4
2
0
3.19
8.48
9.59
6.04
7.09
10.52
8.54
13.08
10.75
13.25
9.18
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
Year

TABLE-2
RANKING OF AUTHORS

S. No.	Rank	Authors	92	93	94	95	96	97	98	99	00	01	01	Total
1	1	Dahlof (C.)	-	7	1	1	-	1	3	2	-	3	3	24
2	2	Diener (H.C.)	-	2	1	-	-	1	2	6	2	6	3	23
3	3	Lipton (R.B.)	-	1	2	-	1	3	2	-	2	3	4	18
4	3	Mathew (N.T.)	1	-	1	1	-	4	2	4	2	2	1	18
5	4	Silberstein (S.D.)	1	2	2	2	-	2	1	2	2	1	1	17
6	4	Tfelt Honesen (P.)	-	1	1	1	4	3	2	1	3	1	-	17
7	5	Pascula (J.)	-	-	2	2	-	-	2	1	3	3	2	15
8	6	Ferrari (M.D.)	-	5	2	1	1	1	-	1	-	3	-	14
9	6	Goadsby (P.J.)	-	-	-	-	4	3	4	1	-	-	2	14
10	7	Cady (R.K.)	-	2	1	1	-	1	1	2	-	1	3	12
11	7	Gobel (H.)	1	1	1	-	1	-	2	2	1	-	3	12
12	8	Evans (R.W.)	-	-	-	-	-	-	-	2	1	6	1	10
13	8	Stewart (W.)	1	1	2	2	1	1	1	-	-	-	1	10
14	9	Allen (C.)	-	-	-	-	-	-	-	2	-	4	2	8
15	9	Spierings (E.L.)	-	-	-	1	-	-	-	1	1	2	3	8
16	9	Welch (K.M.)	-	2	2	-	-	1	-	1	-	2	-	8
17	10	Dowson (A.J.)	-	-	-	-	1	1	-	3	-	1	1	7
18	10	Goldstein (J.)	-	-	-	-	-	-	3	2	-	1	1	7
19	10	Krychantowski (A.V.)	-	-	-	-	-	-	-	4	-	2	1	7
20	11	Pradalier (A.)	-	-	1	1	-	1	-	-	1	1	1	6
21	11	Sheftell (F.D.)	-	-	1	-	-	-	-	1	3	-	1	6
22	11	Antonoci (F.)	1	1	3	-	-	1	-	-	-	-	-	6
23	12	Appunonee (B.E.)	-	1	-	2	1	-	-	-	-	-	1	5
24	12	Diamond (S.)	-	-	-	1	-	-	-	1	1	1	1	5
25	12	Morey (S.S.)	-	-	-	-	-	-	-	-	4	-	1	5
26	12	Olesen (C.)	-	1	1	-	-	1	-	-	1	1	-	5
27	12	Ropport (A.)	-	-	-	1	1	1	-	-	-	1	1	5
28	12	Rasmussen (B.K.)	-	2	1	1	1	-	-	-	-	-	-	5
29	12	Abu-Arafeh (I.)	-	1	-	1	1	1	-	-	-	-	1	5
30	12	Schoenen J	-	-	3	-	-	1	1	-	-	-	-	5
31	12	Visser (W.H.)	1	-	4	-	-	-	-	-	-	-	-	5

13 Authors Contributed 4 articles each.

32 Authors Contributed 3 articles each.

106 Authors Contributed 2 articles each.

1009 Authors Contributed 1 articles each.

Authorship Pattern

Multiple authorship is a characteristic feature of modern science and there has been a consistent trend towards increased collaboration in all the branches of science.

It has been found that the rate of increase in the multiple authorship varies considerably with the subject concerned.

Table-3 shows the pattern of single and multiple authorship.

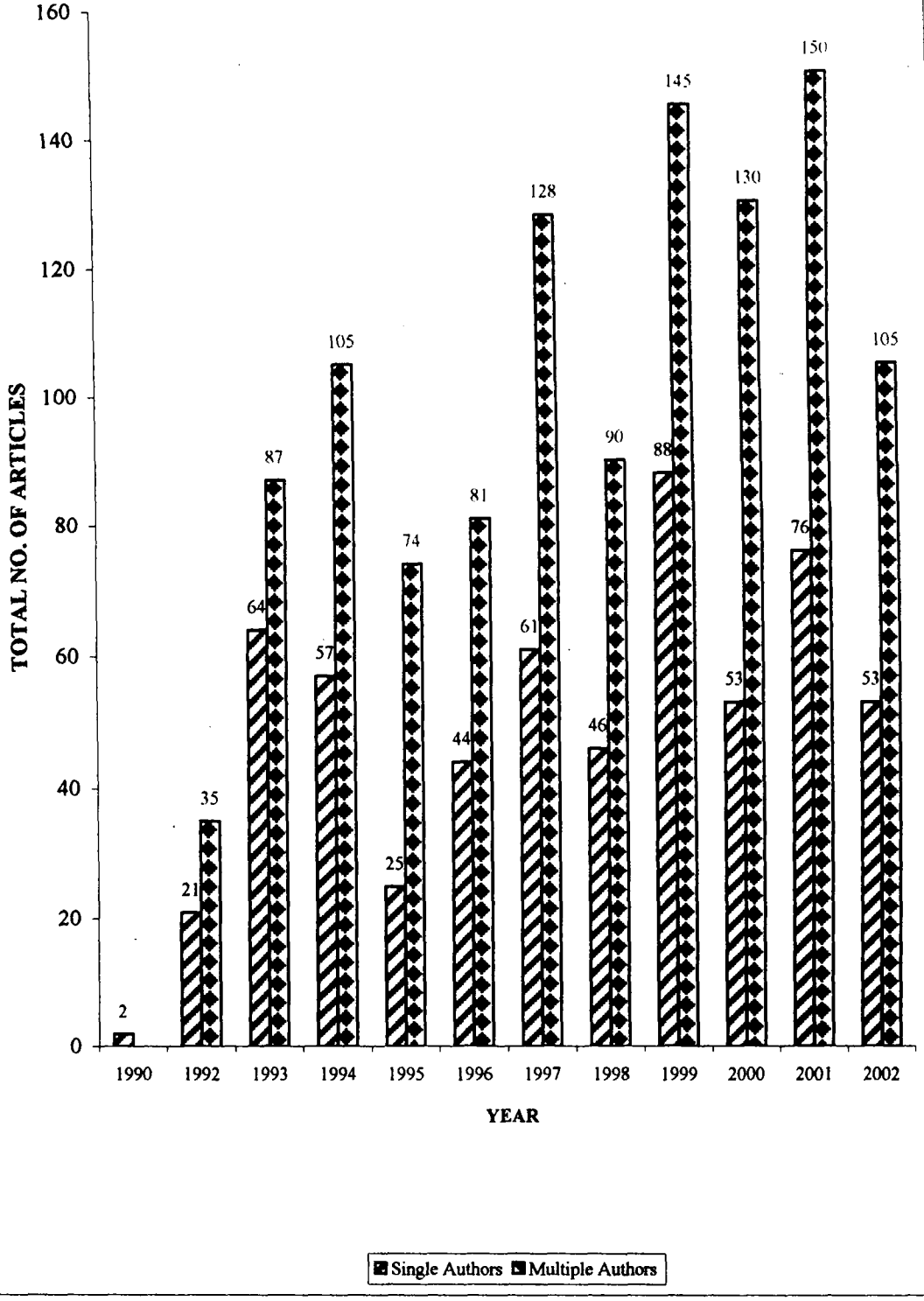
Table-3

AUTHORS DISTRIBUTION PATTERN

S. No.	Year	Single Authors	% Age	Multiple Authors	% Age
1	1990	2	0.11	--	--
2	1992	21	1.22	35	2.03
3	1993	64	3.72	87	5.05
4	1994	57	3.31	105	6.10
5	1995	25	1.45	74	4.30
6	1996	44	2.55	81	4.70
7	1997	61	3.54	128	7.44
8	1998	46	2.67	90	5.23
9	1999	88	5.11	145	8.43
10	2000	53	3.08	130	7.55
11	2001	76	4.41	150	8.72
12	2002	53	3.08	105	6.10
Total	**590**			**1130**	

Grant Total = 590+1130=1720

AUTHOR-WISE DISTRIBUTION



Ranking of Journals

232 journals were analysed in relation to their productivity. The more frequently published journals, consulted by scientists working on the subject **'Migraine'** were identified and the ranked list of journals as prepared by decreasing productivity.

The list of journals shows that the **'Cephalalgia'** is the journal with the most articles.

It has 270 out of 1720 articles i.e. (15.6%) of the total. Next three positions are occupied by journals like **'Headache'** (15.2%) **'Neuralogy'** (10.1%) and **'Revue Neuralogiqual'** (2.03%) respectively. These four journals constitute around 42.93% of the literature and the remaining 57.47% is covered by 228 journals.

The following table-4 shows the ranking of journals.

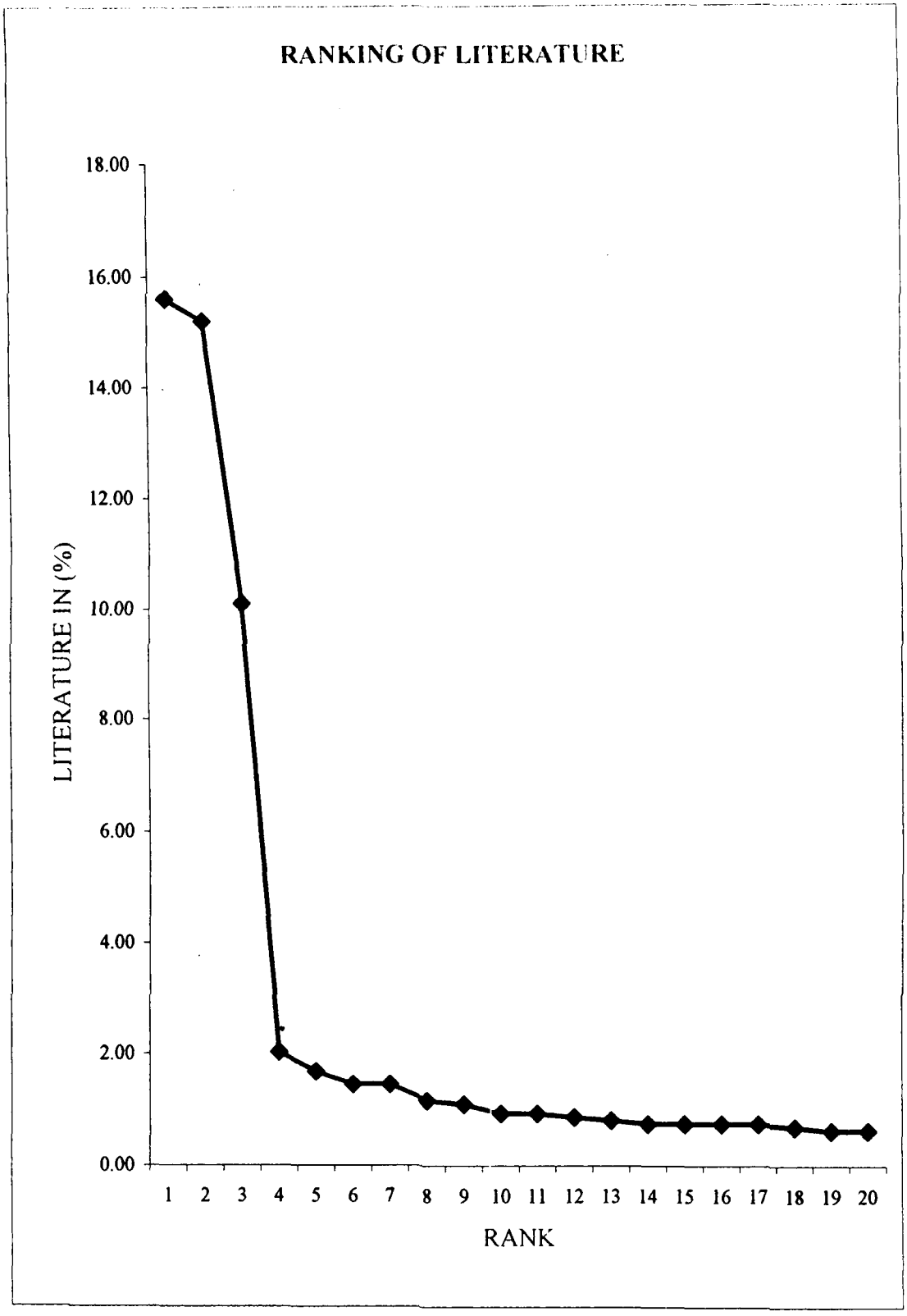
Table-4

RANKING OF JOURNALS

S. No.	Rank	Name of the journals	92	93	94	95	96	97	98	99	00	01	02	Total	% Age
1	1	Cephalalgia	4	16	28	11	13	43	29	52	26	38	10	270	15.6
2	2	Headache	10	29	23	14	17	23	17	20	30	47	33	263	15.2
3	3	Neurology	1	6	32	10	8	29	15	14	23	19	17	174	10.1
4	4	Revue Neurologiquel	1	-	-	2	4	9	4	5	5	3	2	35	2.03
5	5	European Neurology	-	1	5	-	8	2	-	2	3	5	3	29	1.68
6	6	Clinical Therapeuties	2	-	4	2	2	-	-	4	3	6	2	25	1.45
7	6	MMW Fortschritte der Medizin	-	-	-	-	-	-	-	2	4	9	10	25	1.45
8	7	Neural Neurochir Pol	4	1	-	6	-	1	1	7	-	-	-	20	1.16
9	8	Archives of Neurology	1	1	2	2	4	2	2	-	2	2	1	19	1.10
10	9	Neurologia	-	1	4	-	1	3	-	6	1	-	-	16	0.93
11	9	Lancet	2	1	1	1	-	1	-	2	3	2	3	16	0.93
12	10	Functional Neurology	1	4	1	1	2	3	2	-	-	1	-	15	0.87
13	11	European Journal of Pharmacology	-	1	-	-	1	2	2	1	3	3	1	14	0.81
14	12	Arquivos de Neuro Psiquitria	-	1	1	-	-	1	5	-	3	2	-	13	0.75
15	12	American Journal of Emergency Medicine	-	1	3	1	2	-	-	2	1	-	3	13	0.75

16	12	Canadian Journal of Neurological Science	2	1	-	-	-	-	1	6	1	2	-	13	0.75
17	12	Journal of Neurology Neurosurgery and psychiatry	1	-	-	1	-	2	3	1	1	1	3	13	0.75
18	13	Zhurnal nevrologil ipoikhitrii imeni SS Karsokva	-	-	2	-	-	3	1	2	2	1	1	12	0.69
19	14	Italian Journals of Neuralogical Sciences	-	-	-	1	-	1	2	7	-	-	-	11	0.63
20	14	International Journal of clinical Practice	-	-	-	-	-	-	1	2	3	5	-	11	0.63
21	14	New England Journal of Medicine	-	2	2	1	-	-	-	-	1	5	-	11	0.63
22	14	Am Fam Physician	-	1	-	1	-	-	2	-	4	-	3	11	0.63
23	15	British Medical Journal	-	-	6	-	3	-	1	-	-	-	-	10	0.58
24	15	Current opinion in Neurology	-	-	3	-	1	2	-	1	-	2	1	10	0.58
25	15	CNS Drugs	-	-	-	-	-	-	-	-	-	3	7	10	0.58
26	15	Drugs	-	1	1	-	-	-	2	3	1	-	2	10	0.58
27	16	Journal of child Neurology	-	1	2	-	-	-	-	-	1	3	2	9	0.52
28	16	Tidsskrift forden Norske laegeforening	-	2	1	1	1	-	-	3	1	-	-	9	0.52

29	16	Annals of Emergency Medicine	-	1	1	3	2	-	-	2	-	-	-	9	0.52
30	16	Acta Neurologica Scandinavica Supplementum	2	-	2	-	1	-	1	2	-	1	-	9	0.52
31	17	**10 Periodical published 8 articles each.**												80	4.65
32	18	**9 Periodical published 7 articles each.**												49	2.84
33	19	**8 Periodical published 6 articles each.**												48	2.79
34	20	**7 Periodical published 5 articles each.**												35	2.03
35	21	**15 Periodical published 4 articles each.**												60	3.48
36	22	**24 Periodical published 3 articles each.**												72	4.18
37	23	**49 Periodical published 2 articles each.**												98	5.69
38	24	**173 Periodical published 1 articles each.**												173	10.0


RANKING OF LITERATURE
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
LITERATURE IN (%)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
RANK

Language wise Distribution of Papers

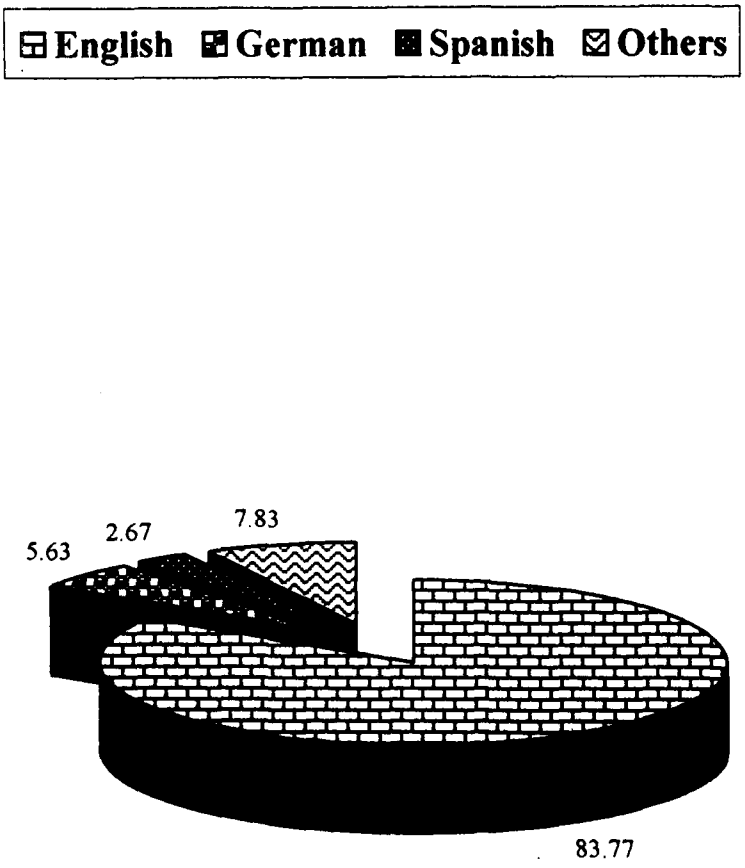
Table-5 shows the language wise distribution of papers. **English** is the most prominent language in the publication of the subject 'Migraine' research, **German** is on second place and **Spanish** is on the third place.

Table-5

LANGUAGE WISE DISTRIBUTION OF PAPERS

S. No.	Rank	Language	Total	% Age
1	1	English	1441	83.77
2	2	German	97	5.63
3	3	Spanish	46	2.67
4	4	French	31	1.80
5	5	Poland	26	1.51
6	6	Russia	16	0.93
7	7	Japanese	11	0.63
8	8	Italian	9	0.52
9	8	Portuguese	9	0.52
10	9	Norwegian	8	0.46
11	10	Sweden	6	0.34
12	10	Dutch	6	0.34
13	10	Danish	6	0.34
14	11	Chinese	5	0.29
15	12	Finnish	1	0.05
16	12	Hungarian	1	0.05
17	12	Serbian	1	0.05
		Grant Total	**1720**	

LANGUAGE-WISE DISTRIBUTION



LEVEL-2

CITATION ANALYSIS

To carry out citation analysis, only journals available in Aligarh libraries were taken up.

The number of such Journals are 3 i.e. **'Headache'** and **'Neurology' 'Cephalalgia'** and source articles are 177, 154, 147, which gave us a total of after this analysis has been done about.

- Ranked list of cited authors and
- Ranked list of cited journals

Table-6

CHRONOLOGICAL ANALYSIS

S. No.	Year	No. of Citations	%Age	Cumulative % Age
1	1926	1	0.07	0.07
2	1945-49	5	0.39	0.46
3	1951-55	5	0.39	0.85
4	1958	2	0.15	1
5	1960-62	7	0.54	1.54
6	1964-69	21	1.64	3.18
7	1970-79	71	5.55	8.73
8	1980-89	255	19.9	28.6
9	1990-99	793	62.0	90.6
10	2000-2002	118	9.23	99.8
	Total	**1278**		

Half-life Period

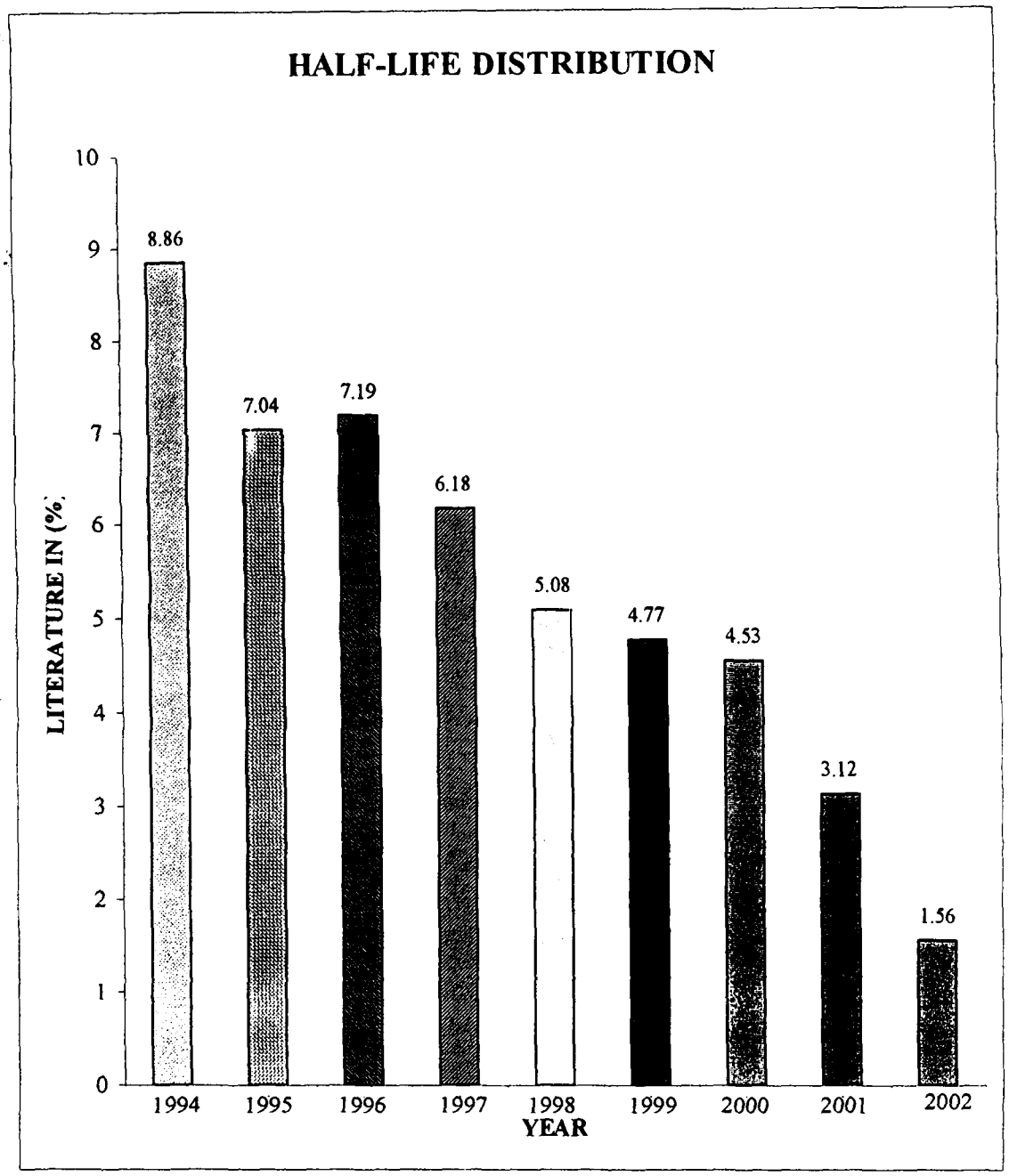
Half-life is a measure of the growth of a discipline. In other words, it also indicates the rate of obsolescence of a discipline.

Table-7 shows that 48.25% of cited literature come form 12 years out of 42 years i.e. only 12 years provide approximately 50% of the literature which is cited.

Table-7

HALF-LIFE OF LITERATURE

S. No.	Year	No. of Citations`	% Age	Cumulative % Age
1	1994	111	8.68	8.68
2	1995	90	7.04	15.82
3	1996	92	7.19	23.01
4	1997	79	6.18	29.19
5	1998	65	5.08	34.27
6	1999	61	4.77	39.04
7	2000	58	4.53	43.57
8	2001	40	3.12	46.69
9	2002	20	1.56	48.25
	Total	**616**		
Total citations (1960-2002) 1278				


HALF-LIFE DISTRIBUTION
LITERATURE IN (%)
10
9
8
7
6
5
4
3
2
1
0
8.86
7.04
7.19
6.18
5.08
4.77
4.53
3.12
1.56
1994
1995
1996
1997
1998
1999
2000
2001
2002
YEAR

Ranked List of Cited Authors

A ranked list of cited authors has been prepared. It shows that which authors is most frequently cited in the research on **'Migraine'** for the period 1992-2002.

Table-8 shows that **M.D. Ferrari** is the cited author followed by **R. B. Lipton** and **R.K. Cady** the 2nd and 3rd rank respectively.

1473 authors have been cited once, 188 authors have been cited twice and 52 authors have been cited thrice.

In table-8 number in the brackets after years shows how many times that year is cited in level-2 study, for example: 1995-(3) means that author is cited thrice in 1995.

Table-8
RANKED LIST OF CITED AUTHORS

S. No.	Rank	Author's Name	Cited Year	Total
1	1	Ferrari (M.D.)	1989-(2),1990,1991,1998-(3),1994-(45), 1995-(2),1996-(27),1997-(3),1998-(4) 1999-(2), 2000-(2), 2001	93
2	2	Lipton (R.B.)	1988,1989,1991-(3),1992-(7),1993-(11), 1994-(12),1995-(3),1996-(7),1997-(7), 1998-(12),1999-(7),2000-(10),2001, 2002	83
3	3	Cady (R.K.)	1991, 1993, 1994, 1995, 1997, 2000, 2001-(23), 2002-(12)	41
4	4	Stewart (W.T.)	1984,1988,1989-(3),1990-(2),1991,1992-(2),1994-(6),1995,1996-(2), 1997-(4), 1998-(5), 1999-(5), 2000	34
5	5	T-felt Hansen (F.)	1980,1981,1983,1984,1985,1986-(2),1993-(9),1994,1995-(2),1997-(2),1998-(4),2000-(4)	29
6	6	Olesen (J.)	1979,1980,1981-(2),1984,1985,1986, 1991-(2),1992-(2),1993-(5),1994,1995-(2),1996-(4), 1997, 1999	25
7	7	Goadsby (P.J.)	1985, 1988, 1991-(2), 1993-(2), 1994-(2), 1995, 1996-(3), 1997-(2), 1998-(4) 1999, 2000-(2)	21

8	7	Silberstein (S.D.)	1990,1991-(4),1992,1993-(4),1994-(5),1995, 1996, 1998, 2000- (3)	21
9	8	Rasmussen (B.K.)	1989,1991-(3),1992-(5),1993-(4),1994,1995, 1996-(3)	18
10	9	Celentane (D.D.)	1989-(3), 1990-(3), 1991-(3), 1992, 1995-(4)	16
11	9	Breslau (N.)	1986, 1991, 1992-(3), 1993-(2), 1994-(2), 1995-(2), 1996, 1998, 2000-(2), 2001	16
12	10	Terwindt (G.M.)	1993, 1994, 1995-(3), 1996-(5), 1998-(2), 1999, 2000-(2)	15
13	11	Solamon (G.D.)	1987,1989,1992-(2),1993-(2),1994-(2),1995-(2), 1996, 1997-(3)	14
14	11	Welch (K.M.A.)	1975,1985,1987,1989-(2),1990,1993-(3),1994-(2), 1997, 1998, 2000	14
15	12	Merikangas (K.R.)	1990-(2), 1993, 1994-(3), 1995-(5), 1997-(2)	13
16	13	Walers (W.E.)	1970-(2),1971-(2),1972,1973,1974-(3),1977, 1983	11
17	13	Russell (M.B.)	1991, 1992, 1994, 1995-(4), 1996-(3), 1999	11
18	13	Mathew (N.T.)	1990, 1991, 1992, 1993-(3), 1994, 1995, 1996, 1997, 2000	11
19	14	Sjaastad (O.)	1984, 1987, 1989-(2), 1992, 1993-(4), 2001	10
20	15	Dahlof (C.)	1992-(4), 1995, 1997, 1999, 2001	8
21	15	Saxena (P.R.)	1978, 1989, 1993-(4), 1995-(2)	8
22	15	Bausser (M.G.)	1985, 1989, 1990, 1993-(3), 1995, 2000	8
23	15	Ottman (R.)	1990, 1992, 1993-(3), 1994-(2), 1996	8
24	16	Lipton (R.B.)	1992, 1994-(2), 2000-(2), 2002-(2)	7
25	16	Pascual (J.)	1954, 1995, 1998, 1999-(2), 2000-(2)	7
26	16	Stang (P.E.)	1991, 1992, 1993-(2), 1994-(2), 1997	7
27	16	Ware (J.E.)	1992,1993,1994,1996, 1997, 1999, 2000	7
28	16	Headache classification, Committee	1988	7
29	16	Jensen (R.)	1991-(3), 1992-(2), 1993-(2)	7

30	16	Diener (H.C.)	1991, 1993, 1994, 1995, 1996-(2), 1999	7
31	17	Linet (M.)	1989-(2), 1990-(2), 1994-(2)	6
32	17	Lance (J.W.)	1964, 1967, 1984, 1986, 1998, 1999	6
33	17	Antonaci (F.)	1989, 1991, 1992-(2), 1993, 2001	6
34	17	Haan (J.)	1994, 1995, 1996, 1997, 1998-(2)	6
35	17	Vonkorff (M.)	1985, 1994-(2), 1995, 1997, 2000	6
36	17	Visser (W.H.)	1994, 1996-(5)	6
37	17	Moskowitz (M.A.)	1988, 1990, 1991, 1992, 1996, 2000	6
38	17	Jountal (A.)	1995, 1996, 1997, 1999, 2000, 2001	6
39	17	Schoenen (J.)	1994-(3), 1996-(2), 1997	6
40	17	Peroutka (S.J.)	1990-(4), 1996-(2)	6
41	17	Osterhaus (J.T.)	1992, 1993-(2), 1994, 1998, 1999	6
42	17	Solomon (S.)	1988, 1991-(2), 1992, 1993, 1994	6
43	17	Ophoff (R.A.)	1994, 1996-(2), 1997, 1999-(2)	6
44	17	Ryan (R.E.)	1983, 1997-(2), 1998-(2), 1999	6
45	18	Bogousslabsky (J.)	1987, 1988-(2), 1991, 1992	5
46	18	Winner (P.)	1993, 1995, 1996, 1998, 2001	5
47	18	Wilmsshurrst (P.J.)	1989, 1994, 1996, 2000(2)	5
48	18	Ducras (A.)	1995, 1997, 1999, 2000, 2001	5
49	18	Diamond (S.)	1987, 1990, 1995, 1999, 2001	5
50	18	Panayiotopoulas (C.P.)	1980, 1987, 1993, 1994, 1997	5
51	18	Edmeads (J.)	1989, 1992, 1993, 1998, 2001	5
52	18	Dartigues (J.F.)	1992, 1993-(2), 1994-(2)	5
53	18	Rapport (A.M.)	1988, 1995-(2), 1997-(2)	5
54	18	Raskin (N.H.)	1986-(3), 1988, 1990	5
55	18	Newman (L.C.)	1991-(2), 1992, 1993, 1994	5
56	18	Davic (G.C.)	1985, 1991, 1992, 1993, 1994	5
57	18	Spierings (E.L.)	1988, 1993, 2001-(2), 2002	5
58	18	Pfaffenrath (V.)	1993, 1994, 1995, 1998, 1999	5

59	18	May (A.)	1993, 1995-(2), 1996, 1998	5
60	18	Martin (G.R.)	1994-(2), 1995, 1996-(2)	5
61	18	Humthrey (P.P.A.)	1989, 1990-(2), 1991, 1994	5
62	18	Henry (P.)	1992, 1993-(2), 1995, 1997	5
63	18	Adam (N.)	1969-(2), 1987, 1993-(2)	5
64	19	Hauser (W.A.)	1990, 1991, 1993-(2)	4
65	19	Vahedi (K.)	1995, 1997, 2000, 2001	4
66	19	International headache Society	1988-(2), 1991, 2000	4
67	19	Peatfield (R.C.)	1986(2), 1993, 1995	4
68	19	Fowler (P.A.)	1991, 1995-(2), 1996	4
67	19	Friedman (A.P.)	1954, 1955, 1962, 1989	4
68	19	Celentano (D.D.)	1990, 1991, 1992-(2)	4
69	19	Angst (J.)	1990, 1993-(3)	4
70	19	Kunkel (R.S.)	1977, 1978, 1979, 1996	4
71	19	Limmroth (V.)	1995-(2), 1997, 1999	4
72	19	Lance (J.W.)	1960, 1966, 1969-(2)	4
73	19	Hockday (J.M.)	1988-(3), 1994	4
74	19	Wall (M.)	1988, 1991-(2), 2000	4
75	19	Wang (S.J.)	1993, 1997, 1998, 2000	4
76	19	Wober-Bingol	1995-(2), 1996-(2)	4
77	19	Blau (J.N.)	1980, 1984, 1987, 1995	4

Ranked List of Cited Journals

Table-9 shows ranked list of cited journals. It gives most frequently used journal by research scientists on **'Migraine'**. The list of journals shows that **'Neurology'** is the most highly cited journal followed by **'Headache'** and **'Cephalalgia'** respectively. In this table number in brackets after year shows how many times in that year it is cited in Level-2 study, e.g. 1995-(3) means that journal is cited thrice in 1995.

181 journals have been cited once, 24 journals have been cited twice and 10 journals have been cited thrice.

Table-9

RANKED LIST OF CITED JOURNALS

S. No.	Rank	Journal's Name	Cited Year	Total
1	1	Neurology	1954, 1972, 1973, 1974, 1975, 1977, 1978-(2), 1979, 1980-(2), 1983, 1986-(2), 1988-(4), 1989-(2), 1990-(2), 1991-(7), 1993-(11), 1994-(3), 1995-(17), 1996-(10), 1997-(27), 1998-(11), 1999-(8), 2000-(21), 2001-(12), 2002-(13)	192
2	2	Headache	1966, 1970, 1973-(2), 1975-(5), 1976, 1977-(3),1978-(4),1979-(3),1980-(2), 1982-(3), 1983-(5), 1984-(2), 1985-(5), 1986-(4), 1987-(3), 1988-(6), 1989-(5), 1990-(13), 1991-(11), 1992-(8), 1993-(13), 1994-(13), 1995-(18), 1996-(7), 1997-(9), 1998-(12), 1999-(10), 2000-(4), 2001-(9)	180
3	3	Cephalalgia	1981-(5),1984,1985-(4),1986-(3), 1987-(5), 1988-(10),1989-(4),1990-(2),1991-(4), 1992-(10),1993-(16), 1994-(12), 1995-(14), 1996-(14),1997-(11), 1998-(10), 1999-(11), 2000-(6), 2001-(6), 2002	149

4	4	Lancet	1970, 1973, 1979, 1981, 1982, 1983, 1984, 1986, 1988, 1989-(2), 1991, 1992-(2), 1993-(2),1994-(2),1995-(2),1996-(3), 1997, 1998-(2), 1999, 2000-(2),2001-(2),2002-(2)	33
5	5	Journal of American Medical association	1962,1968, 1972, 1973-(3), 1989-(3), 1990, 1991-(2), 1992, 1993-(2),1994, 1995,1996-(4),1997-(2),1998-(4),2000-(2).	28
6	6	European Neurology	1991-(6), 1992, 1993, 1994-(2), 1995, 1996-(7), 1997, 1999-(2)	21
7	7	British Medical Journal	1971, 1989-(2), 1992, 1993-(3), 1994-(5), 1995-(3), 1996-(3), 1999, 2001	20
8	8	Stroke	1984, 1987, 1988, 1992,1993-(5), 1994-(3), 1996, 1997, 1999, 2000, 2001	17
9	9	Archives of Neurology	1962,1966,1969,1970,1976,1985,1986-(4),1987-(4),1988-(3),1990-(3),1991,1992-(2),1995-(3),1996-(2),1997-(4),2000, 2001	15
10	10	Journal of Neurology, Neurosurgery and Psychiatry	1964, 1970, 1972, 1976, 1984, 1987, 1988, 1992, 1994-(2), 1996, 1997, 2002	14
11	11	New England Journal of Medicine	1969, 1972, 1987, 1988-(2), 1991-(2), 1993, 1994-(2), 1996, 2001	13
12	12	Brain	1985, 1991, 1993, 1995, 1996-(2), 1997, 1998, 2000-(4), 2002	13
13	13	Annals of Neurology	1980, 1981-(2), 1983, 1987, 1991-(2), 1992, 1993, 1997, 1998-(2), 1992, 1993, 1997, 1998-(2), 2000	13
14	14	British Journal of Pharmacology	1978, 1982, 1985, 1993, 1996, 1997, 1998	11
15	14	Developmental Medicine and Neurology	1979, 1990, 1992-(3), 1999-(2), 1998, 1999-(2), 2000	11
16	14	Archives of General Psychiatry	1981, 1983, 1984-(4), 1989, 1990, 1991, 1993, 2000	11
17	15	Neuroepidemiology	1985, 1991, 1992, 1993-(3), 1995, 1997, 1999	10

18	16	European Journal of Pharmacology	1984, 1986, 1989-(2), 1995-(2), 1998, 1999, 2000	9
19	16	British Journal of Biomedical Sciences	1964, 1970, 1971, 1975, 1977, 1980, 1980, 1994, 1996, 1997, 1999	9
20	16	British Journal of Pharmacology	1984, 1990, 1995, 1997, 1998, 1999-(2), 2000-(2)	9
21	16	Journal of Neurosci	1985, 1986, 1989, 1991, 1994-(2) 1996, 1998, 2001	9
22	17	Journal of Psychosomatic Research	1985, 1988-(2), 1989, 1991, 1993-(3)	8
23	17	Anaesthesia	1985, 1987, 1989-(2), 1990-(2), 1991, 1993-(2)	8
24	18	Drugs	1990, 1992, 1994, 1998, 1999-(2), 2000	7
25	18	Pain	1992, 1993, 1996-(3), 1999, 2000	7
26	18	Journal of Clinical Epidemiology	1989, 1990, 1991, 1992, 1993, 1995, 1999	7
27	19	Epilepsia	1979, 1990, 1991, 1993, 1994, 1995	6
28	19	Medical Care	1988, 1992, 1993, 1994, 1996, 1999	6
29	19	Acta Neurologia Scandenanica	1982, 1984, 1985, 1988, 1989, 1997	6
30	20	Annals of Internal Medicine	1983, 1996, 1997, 1999-(2)	5
31	20	Trends in Pharmocolgical Science	1989, 1991, 1992, 1993, 1994	5
32	20	Clinical Pharmocology and Therapeutiecs	1979-(2), 1983, 1985, 1986	5
33	21	Clinical Therapeuties	1989, 2000, 2001-(2)	4
34	21	Neurologic Clinics	1989, 1990, 1992, 1997	4
35	21	Postgraduate Medical Journal	1976, 1977, 1980, 1989	4
36	21	American Journal of Epidemiology	1983, 1985, 1991, 1997	4
37	21	International Journal of Epidemiol	1973, 1992, 1994, 1995	4

Ranked List of Cited Books

Table-10 shows that among the number of cited books, most citation were in 1993 i.e. 34. From 1944 to 1960 only 7 citations were there . Later the citations were 1966-(1), 1968-(3), 1969-(2), 1970-(1), 1972-(2), 1974-(6), 1975-(2), 1977-(1), 1972-(2), 1977-(1). From 1979 to 2002 there were continuous citations .

Table-10

RANKED LIST OF CITED BOOKS

44	46	48	51	54	58	60	66	68	69	70	72	74	75	77	79	80	81	82	83	84	85	86
1	1	1	1	1	1	1	1	3	2	1	2	6	2	1	1	1	1	4	3	10	4	6

87	88	89	90	91	92	93	94	95	96	97	98	99	2000	2001	2002	Total
12	4	6	3	6	6	34	10	5	13	7	5	4	3	1	8	182

APPLICATION OF THE BIBLIOMETRIC LAWS

Bradford's Law

This law states that if scientific journals are arranged according to their decreasing productivity of articles on a given subject they may be divided into a nucleus of periodicals more particularly devoted to the subject and several groups or zones each zone have nearly same number of articles.

The formula is $1 : n : n^2$ where 1 is the number of periodicals and n is a multiplier.

To check the validity of this law, 232 journals were divided into three zones according to their productivity.

In the first zone, 2 journals contained 553 articles; in the second zone 28 journals contained 573 articles and remaining 293 journals contained 614 in the third zone, according to this the periodicals in each zone covered approximately 1/3 items of the total, for all this data has been taken form table-11 the analysis shows phenomenon of scattering of items in different zone of periodicals. The first zone is the nucleus zone as it contain 2 periodicals followed by 28 periodicals in second zone and 293 periodicals in third zone, the zone thus identified will from an approximately geometric series given below:

Table-11

S. No.	Zone	No. of articles	Cumulative No. of articles	No. of Journals	Cumulative No. of Journals
1	I	533	533	2	2
2	II	573	1106	28	30
3	III	614	1720	293	323

Here,

$28 = 28 = 2 \times 14$ and $293 \cong 392 = 2 \times 14 \times 14$ (approx)

Therefore, now the series is

$2 : 2 \times 14 : 2 \times 14 \times 14$

on substituting,

14 = n we get,

$2 : 2n : 2 n^2$.

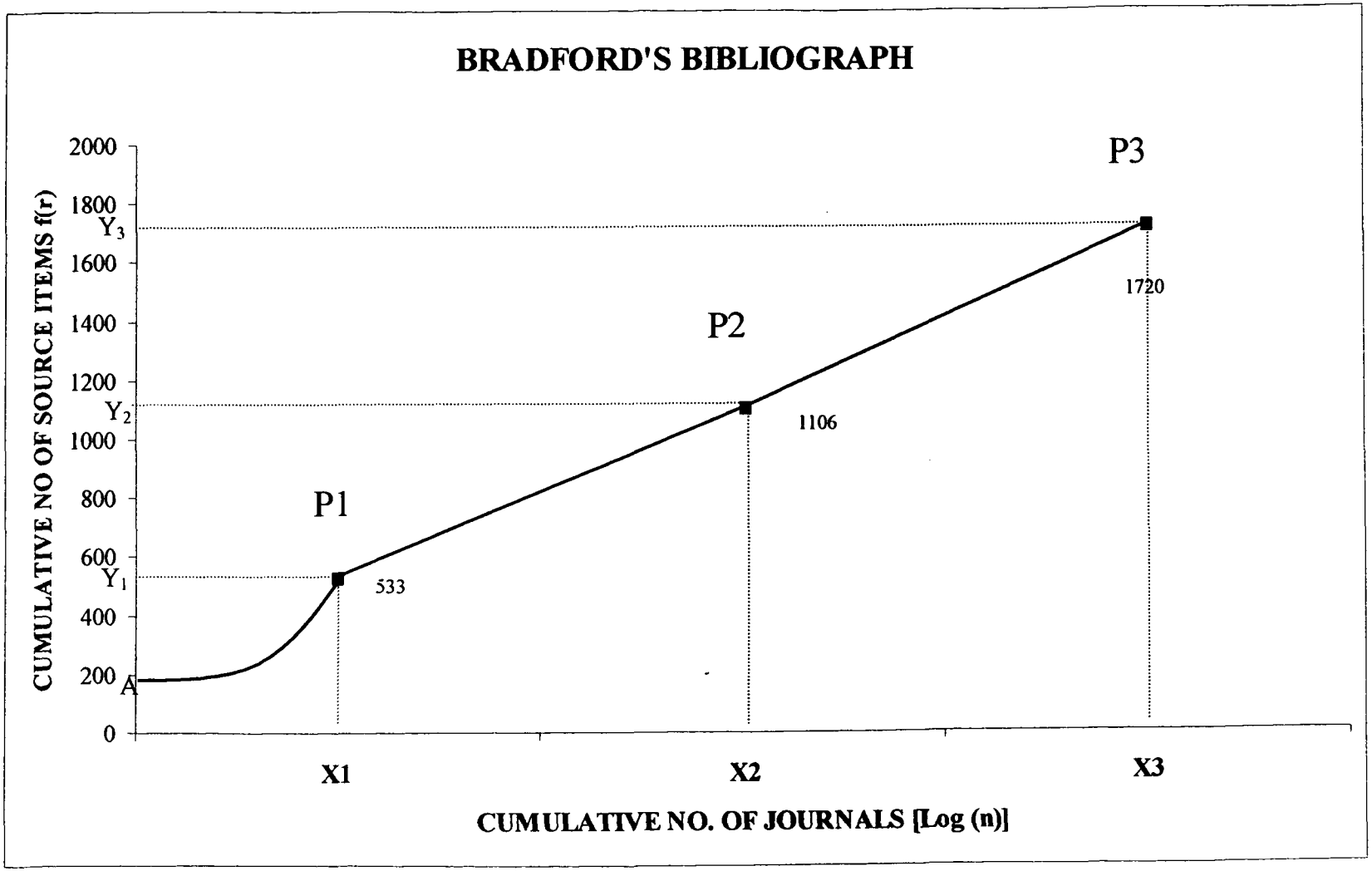
i.e. $1n : n^2$

(where 1 is the number of journals in the nucleus and n is a multiplier).

The number of journals in the nucleus can be obtained by plotting f (r) and log n on semi logarithmic graph paper (a bibliograph), where f (r) is cumulative frequency and log n is log of rank of journals as shown in the graph. This graph is drawn with the help of data analysed and computed in table-11.

The log value of 2 journals in the first zone is 0.3 the log value of 28 journals in the second zone 1.44 and the log value of 293 journals in the third zone is 2.4.

Taking log n on X-axis and number of items in each zone on X-axis a graph was plotted as shown. The Bibliograph thus obtained is found to be, by and large, similar to Bradford's bibliograph. As the graph begins as a rising curve AP1 and continues as a straight line, the rising part of the graph represents the nucleus of highly productive journals. The points P1, P2 and P3 on the bibliograph are the boundaries of three equiproductive zones in which almost the same number of articles as the nucleus (represented by or 1 = r1, r2 = r2 r3) derived from an increasing large number journals (represented by CX1, X1X2 and X2X3). **The Bradford's law is proved thus.**


BRADFORD'S BIBLIOGRAPH
CUMULATIVE NO OF SOURCE ITEMS f(r)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Y3
Y2
Y1
A
P1
P2
P3
533
1106
1720
X1
X2
X3
CUMULATIVE NO. OF JOURNALS [Log (n)]

Lotka's Inverse Square Law

The Lotka's inverse square law states the number of scientists who contribute n papers will be $1/n^2$ of those contributing only one paper.

Table-12

No. of Authors	No. of Papers
1009	1
106	2
32	3
13	4

Scientist contributing two papers.

According to Lotka's inverse square law

No. of scientists publishing n papers = no. of scientist publishing one paper/n^2

where n = No. of Papers

On substituting n = 2 in the above Formula

No. of scientist publishing 2 papers $= \frac{1009}{2^2} = \frac{1009}{4} = 252.25$

The number of scientist publishing two papers are 106. However, according to Lotka's Law it should be 252.25 authors which is far more than actual figure.

Scientist contributing three papers

On substituting, n = 3

No. of scientist publishing 3 papers = $\frac{1009}{3^2} = \frac{1009}{9} = 112.11$

During the analysis it was found that only 32 authors contributed 3 papers each, which is less than the calculated figure i.e. 112.11

Scientist contributing four papers

No. of scientist publishing 4 papers = $\frac{1009}{4^2} = \frac{1009}{16} = 63.06$

The analysis of actual data shows that 13 authors contributed 4 papers figure i.e. 63.06.

It may, therefore, be concluded that the trends of research now days have changed as compared to the period when Lotka's was formulated that is why on the basis of the analysis of the present data it is difficult to testify the validity of Lotka's Law.

Zipf's Law

It is not applied as it deals with the long textual matter of the articles.

Price square Root of Scientific Productivity

This law states that "half of the scientific papers are contributed by square root of total number of authors".

Total No. of Papers = 1720

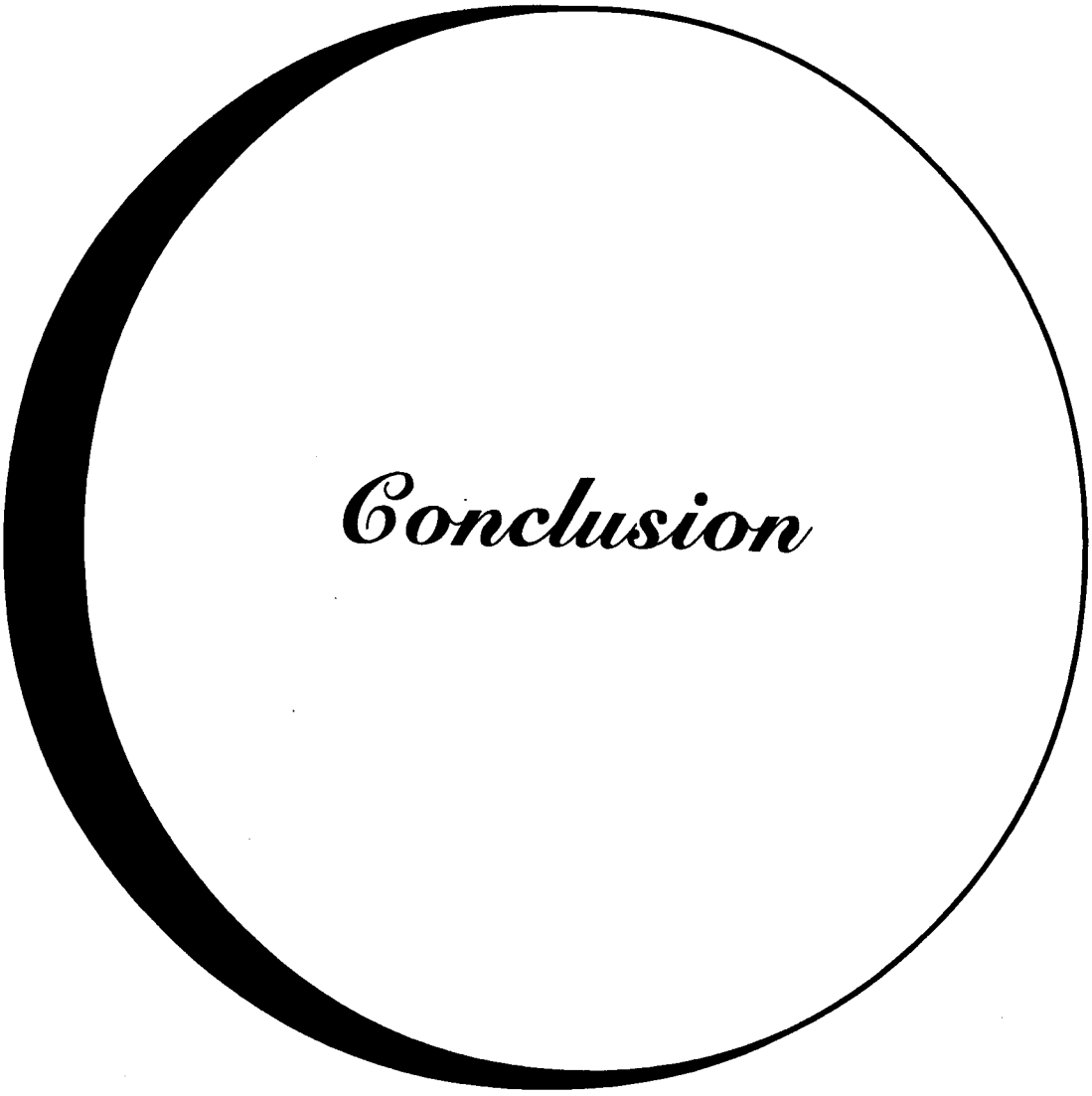
Total No. of Authors = 1472

Half of the Scientific Papers = 860

Square toot of total authors = 1472 □ 38.36

≅ 38

From analysis we get that 38 authors have contributed 625 papers which is approximately equal 36.3% whereas 50% would be 860 which is given by law. This law can not be proved exactly because of multiple authorship pattern which largely prevails now – a – days.


Conclusion

CONCLUSION

Bibliometric study has been done on the topic **'Migraine'** of the period (1992-2002). **The analysis is done at two different levels. Level-2 gives the core journal of the subject, the most productive authors, most dominant language.**

Application of laws has been done on the basis of bibliometric analysis the following results have been found out.

TOP THREE

RESULT OF LEVEL-1

A) Most productive authors

- **C. Dahlof** with 24 articles at first position
- **H. C. Diener** with 23 articles at second position
- **R. B. Lipton** with 18 articles at third position

B) Most productive journals

- **Cephalalgia** – 270 articles at first position
- **Headache** – 263 articles at second position
- **Neurology** – 174 articles at third position

C) Most used languages

- **English** with 1441 articles, 83.77% at first position.
- **German** with 97 articles, 5.63% at second position.
- **Spanish** with 46 articles, 2.67% at third position.

RESULT OF LEVEL-2

A) Most cited authors

- **M.D. Ferrari** with 93 times is the most cited author.
- **R.B. Lipton** with 83 times is the second most cited author.
- **R.K. Cady** with 41 times is the third most cited author.

B) **Most cited Journals**

- **Neurology** with 192 times is the most cited journal.
- **Headache** with 180 times is the second most cited journal.
- **Cephalalgia** with 149 times is the third most cited journal.

FINDINGS

After going through the results of Level-1 & Level-2 literature, it is found that the journals used by the scientist on the topic **'Migraine'** are not similar at the two levels.

In Level-1 **'Migraine'** comes on the top as the most productive journal but it is at the third rank in level-2.

In Level-2 **'Neurology'** comes on the top but **'Cephalalgia'** is at the third rank.

In case of authorship ranking pattern shows that most productive authors(s) are not the most cited one. For e.g. in Level-1 **C. Dohlof** is the most productive author with the rank first followed by **H.C. Diener** and **R.B. Lipton** with 2nd and 3rd respectively but in Level-2 **M.D. Ferrari** is the most cited author followed by **R.B. Lipton** and **R.K. Cady** at the 2nd and 3rd respectively and **C. Dahlof** (most productive of Level-1) and **H.C. Diener** (2nd ranked author of level-1) are ranked 15th and 30th in level-2.

An obvious finding is that quantity and quality do not always coincide, as it is seen that the most productive journal as well as the most productive author. i.e. the ones which have the largest quantity are not the most cited i.e. qualitatively they are not the best.

So in the end it is observed that the study at both levels gives us a picture which tells us some what about the nature and characteristics of the journals and authors who are engaged in producing papers on **'Migraine'**. But at the same time it would be wise to mention some of its limitation that one encounters mainly in Level-2, as only few journal are taken for citation analysis there is chance of wrong findings

specially in the core of journals as it is being observed that every journal has more of its citations than of others and if any author contribute a paper in a particular journal than it may not be cited in another journal and in case that journal is not taken up for citation analysis then there is always chance of missing of the author in the citation analysis and in the process it will give some what Regarding the laws of Bibliometrics out of four main laws were studied.

Lotka's Law could not be proved may be because of the prevalence of Multiple authorship.

Zipf's Law could not be applied because it refers to counting of words in long textual matter.

Bradford's Law was studied and it was proved. The total jouranls were divided into three zones. All the three zones approximately equal no. of articles though the no. of journals increased from zone 1 to zone 3 which is what Bradford's Law says.

Price square Law was also studied, this law is neither proved nor disproved.

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